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June, 1935

Vol. 142, No. 6

AMERICAN GAS JOURNAL

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THE WEATHER
Are you equipped for next winter's loads?

Front Page News

EXTRA DISTRIBUTION NEW

Vol. 1—No. 1 JUNE, 1935 ★ ★ ★ ★ ★

DISTRIBUTION MEN FIND NEW WAYS TO SOLVE COSTLY PROBLEM OF UNACCOUNTED-FOR GAS

Pittsburgh Equitable Meter Company and its subsidiary, Merco Nordstrom Valve Company, have the only complete line of products especially developed to aid the distribution man in solving his problems. Today, more than ever before, distribution men realize that profits must come from economies. Not only can unaccounted-for gas be greatly reduced but also high maintenance costs can be eliminated through the replacement of time worn equipment with the most modern and efficient.

EMCO Domestic Meters, Tin, Iron, and Curb Box types, stop revenue losses through accurate measurement of all gas consumption. Sturdy construction resulting in long life, reduces maintenance costs.

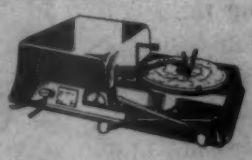
The EMCO Bell Joint Clamp is designed specifically to stop gas loss at joints of existing cast iron bell and spigot pipe. Sectional construction permits application without disturbing the existing line and adjustability feature will accommodate variations from standard bell and spigot dimensions.

Nordstrom Lubricated Plug Valves are used by distribution men because they have been found to be the only valves that give positive shut-off for an indefinite time with a minimum of attention. Lubricant seals the plug against leakage, and provides easy operation.

Emcoloaders, used in conjunction with EMCO Balanced Valve Regulators, reduce gas losses by automatically adjusting distribution pressure in proportion to demands.

For large volume measurement, such as industrial services, EMCO Pressed Steel Meters have proven their superiority. They measure accurately even the off-peak volumes. Their sturdy pressed steel construction and compact size are exclusive EMCO features.

The EMCORECTOR, installed on any high pressure, positive gas meter, gives direct reading of volume corrected to any base pressure, regardless of line pressure. It eliminates the chance of error and expense in making chart calculations.



The EMCO-McGaughy Integrator presents the only present known method of obtaining EXACT calculation of the extension of Orifice Meter Charts. With it chance of human error is eliminated entirely and chart calculations are speeded up to the extent that one operator with an EMCO-McGaughy Integrator can calculate four times as many charts as can be done by the inspection method in the same given time.

WORLD'S LARGEST METER, REGULATOR AND VALVE PLANTS

The Pittsburgh Equitable Meter Company and its subsidiary, Merco Nordstrom Valve Company, operate four factories located at Pittsburgh, Pa., Oakland, Calif., Hopewell, N. J., and Tulsa, Okla. With several million dollars invested in buildings and equipment, these plants are considered to be the most modern and best equipped meter, regulator and valve factories in the world. They are equipped with finest modern automatic machinery to assure minute precision in the manufacture of EMCO meters and regulators and Nordstrom lubricated plug valves.

Complete chemical and physical laboratories are maintained in which a great variety of determinations are constantly being made on all raw materials. In addition, finished products are given numerous tests under conditions more exacting than encountered in actual service. Competent experienced engineers are in charge of these laboratories which are available at all times for the scientific solution of customers' problems.

PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.
MAIN OFFICES PITTSBURGH, PA.
New York Columbia Chicago Memphis Kansas City Philadelphia Tulsa Houston Los Angeles Oakland

IMPACT SISTANCE DOUBLED

Installation of Super-de Lavaud Pipe at Corpus Christi, Texas

Centrifugally cast in a metal mold without chill

CONSIDERING the historical longevity of cast iron pipe may seem like "painting the lily" to state that Super-de Lavaud Pipe will render superservice as an underground conduit. Yet results of tests show conclusively that the *metal structure* of pipe produced by the Super-de Lavaud Process is fundamentally superior. A basic metallurgical advance is achieved by casting the gray iron in a metal mold *without chill*. The outstanding result, attested by eight million feet of Super-de Lavaud Pipe already sold and installed, is an extraordinary increase in impact-strength, without reduction of tensile and bursting strength. A booklet describing the Super-de Lavaud Process will be sent on request.

U.S. SUPER-de LAVAUD PIPE

CAST WITHOUT CHILL IN A METAL MOLD

UNITED STATES PIPE AND FOUNDRY CO., General Office: BURLINGTON, N. J.

Foundries and Sales Offices throughout the United States

AMERICAN GAS JOURNAL

Established 1859

JUNE 1935

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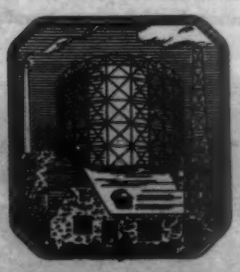

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It takes only one wrong answer to make 10 customers MAD!

NO. 1 OF A SERIES OF SUGGESTIONS ON UTILITY PROBLEMS

NEVER before was it so important to maintain satisfactory public relations with every customer. One wrong or delayed answer to a question or complaint, resulting from clumsy, incomplete, or inaccurate records, may antagonize not only the customer but all his family and friends.

Customer History Record first essential

There is one way to be sure that every customer is dealt with as tactfully as if you were handling him yourself . . . a system that gives you a complete check on his credit in *fifteen seconds*. And that is to use the Remington Rand Customer History Record.

How it can benefit your company

By recording every essential fact about every customer in one handy, visible card system, this record gives you any information you need in a matter of seconds. Utilities now using the Customer History Record say that aside from the all-important question of customer goodwill, it results in actual cash savings all along the line.

Reduces clerical operating expense

The Customer History Record takes all the facts from ten or fifteen different sources and puts them on one visible card, eliminating all duplication of both posting and reference. Cards are filed by Remington Rand's exclusive Soundex system which groups similar sounding names regardless of variations in spelling. With Mr. Smith spelling his name 15 ways, Mr. Burke and Mr. Baer more than 40 each, Soundex reduces errors to minimum, cuts filing, finding and reference time 50% to 60%.

Collection expense reduced

A complete history of all past experience with each customer makes it possible to concentrate collection effort on those accounts which need it . . . and to avoid those which do not. This selectivity cuts collection expense at least 50%.

Bad debt losses cut

Intelligent credit authorization, selective collection effort and positive control over transfer of old accounts to new . . . all help to reduce bad debt losses. One large midwest utility with an unusually high percentage of transient customers, reports a bad debt loss of less than two-tenths of one percent with this system—yet averages only one collector for every 24,000 accounts (including active, inactive and merchandise collections.)

Previous bad debt losses recovered

Wherever the Customer History Record has been installed, it has brought to light large amounts of previous bad debt losses—amounts which could either be transferred to current accounts or liquidated through the application of inactive or unclaimed deposits. Frequently, *this bad debt recovery alone equals the total cost of installation including equipment and labor . . . in some instances several times that amount.*

Amazing accuracy of detail

See what each individual card in this Kardex System shows:

1. Permanent application for each customer showing current and previous lo-

WHICH OF THESE PROBLEMS WORRIES YOU?

1. How to be sure new business does not cost more than it's worth.
2. How to make appliance and saturation records sell merchandise.
3. How to avoid shortages, and increase turn-over of appliance stock.
4. How to control material and supplies stock to increase turn-over and decrease inventory.
5. How to have complete analyses of labor and material charges by operating and capital investment accounts . . . yet save clerical time.
6. How to service customers in one-third the time . . . and eliminate writing orders.
7. How to cut billing and bookkeeping costs without sacrifice of records.

Ok.. it's

cations, references, occupation, business address, name of husband or wife, complete name and signature.

2. Record of all collection effort and service cut-offs.
3. Record of all bad checks, unearned discounts allowed, and by-passing of service.
4. Bad debt flashes red signal assuring collection effort if customer returns for service.
5. Record of all security deposits received, refunded, or applied to liquidate final bills for both active and inactive accounts.
6. Record of guarantors and accounts guaranteed.
7. Inactive file shows complete record of former customers who return for service.
8. Record of appliance sales contracts and repossessed merchandise.
9. Record of special credit authorizations, complaints or information peculiar to a customer.

Installation cost reduced . . . accuracy guaranteed

Remington Rand maintains a staff of experienced professional supervisors to guarantee that your installation is complete and accurate in every detail. As a direct result of this service, your installation costs are greatly reduced, your personnel selected and trained, your operating procedure organized and manual prepared . . . all without disturbing your present routine.

One of many

Remington Rand services

The Customer History Record is only one of the services which Remington Rand offers. The biggest service of all is the fact that Remington Rand can be impartial and unbiased in its application and advice because it makes all types and kinds of office equipment. Worn-out or out-of-date equipment—even though written off—can be a source of great waste. Phone the Remington Rand man in your city today—or, write Public Utility Department, Remington Rand Inc., Buffalo, New York.

Some of the Remington Rand products saving money for utilities

NEW KARDEX on wheels permits inventory, production, sales and service expense records to be wheeled instantly to executives' desks for analysis or dictation . . . then wheeled back to posting clerks' desks. At night, valuable records can be wheeled into the vault for safe keeping.

POWERS PUNCHED CARDS will record 90 columns of salient facts covering all phases of utility management control . . . gives executives quick, accurate analyses as a no-cost by-product of routine accounting. No capital investment needed . . . Powers machines are leased, not sold.

Are outworn equipment and methods costing you money?

REMINGTON ACCOUNTING . . . The new completely electrified Remington Accounting Machine brings new speed and accuracy to customer billing, payrolls, accounts payable, departmental distributions. Cuts posting costs 10% to 50%. Compare this with your present bookkeeping methods.

UNLESS YOU HAVE SEEN and *heard* the new Remington Noiseless typewriter you have no idea how much it means in increased office efficiency. 23 important mechanical improvements produce better looking letters, more and better carbon copies, cleaner, sharper stencils. Ask for free trial.

from Remington Rand

"LONG LIFE PIPE"
with gas-tight mechanical joints

Mechanical joints made by C. I. P. R. A. members are *bottle-tight* as demonstrated by rigid tests conducted by the laboratory of the American Gas Association. Cast iron pipe is unequalled for *long life* as attested by records showing that 29 of America's large cities are still served by some or all of their original cast iron gas mains laid from 44 to 101 years ago. Cast iron pipe and mechanical joints are an ideal combination for distribution mains.

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago, Ill.

CAST IRON PIPE

METHODS OF EVALUATING BIDS NOW IN USE BY ENGINEERS RATE THE USEFUL LIFE OF CAST IRON PIPE AT 100 YEARS

AS THE EDITOR SEES IT

A Step Toward Socialism

IN SPITE of the unprecedented waves of protest from all parts of the country, the Senate Committee on Interstate Commerce, on May 13th, reported favorably the Wheeler-Rayburn Bill and sent it to the Senate in a somewhat revised though none the less destructive form. In fact, new provisions have actually been added to facilitate governmental control of utility properties.

We should not be misled by certain verbal changes which have been made in an apparent effort to lull those whose savings and property are at stake into a temporary sense of security, and stem the continuing tide of protest and indignation long enough to permit the bill to be jammed through Congress. A wolf loses nothing of its vicious and treacherous nature when dressed in sheep's clothing. *Likewise the bill now before the Senate, although cloaked in somewhat more pleasing outward attire, still contains virtually all of the major destructive features of the original draft.*

In spite of the smoke screen which its proponents have attempted to throw up around the bill, there stand out the clear and definite words of the original draft: "It is hereby declared to be the policy of this title, in accordance with which policy all the provisions of this title shall be interpreted, . . . to provide at the end of five years for the abolition of the public utility holding company."

When we seek the motive or reason for this malign and destructive purpose we can find no clear cut, candid statement by any proponent of the bill. Instead we find nothing but evasion and glittering generalities to the effect that the owner of holding company securities will really not be so badly off, that the owner of operating securities will be greatly benefited and the public will receive service at substantially lower rates. "Come into my parlor," said the spider to the fly in the fable, "it really is a pretty nice place and I am sure you will like it"; but we all know what happened to the fly. Holders of public utility securities may well remember that fable.

Lacking a candid statement of its true objective, we are obliged to look beneath the surface.

The bill was not prepared because of any demand on the part of investors who had lost money in holding company securities, nor of the public which believed lower rates could be obtained thereby, nor of public service commissions that believed themselves incapable of continuing to regulate the utility business. At the hearings before the Senate and House Committees there was not, so far as we know, a single representative of a state or municipality, of a consumers organization or of investors in utility securities who appeared in favor of the bill as drawn. In fact, about its only supporters were the Brain Trusters, New Dealers and Federal Bureaucrats.

The National Association of Railroad and Utilities Commissioners was represented before the House Committee on April 5 by H. Lester Hooker, Chairman of the Legislation Committee and John E. Benton, General Solicitor. Mr. Hooker said in part:

"The National Association of Railroad and Utilities Commissioners is definitely opposed to that section of the public utilities bill which calls for the dissolution of holding companies, and has 'violent objections' to the sections regulating operating companies.

. . . . . .

"Our Association favors strict and adequate regulation by the States to the full extent of their power, and by the Federal government *only* to the extent that the power of the States cannot control.

"It has been repeatedly stated, by all of the proponents of this bill, that the avowed purpose of this legislation is merely to 'supplement' or to 'fill in a gap' in state regulation and not to supplant, supersede or duplicate the regulation within the power of the States in any effect.

"However, notwithstanding these avowals, a close study and detailed analysis of the provisions of Title I, and of parts of Title II show that State regulation, and the powers reserved to the States are substantially emasculated and devastated.

"Our Association has violent objections to many of the sections of this bill, as drawn. We feel that some of the sections included should be eliminated entirely. Under the guise of interstate commerce, the Congress is asked by this proposed legislation to take away the rights and privileges reserved to the States to a greater extent, we believe, than has any Congress thus far been asked to go on any similar subject.

. . . . . .

"I can conceive of nothing that would lead to more dissatisfaction among the public, in the regulation of a matter of this character, than to transfer local problems to some commission in Washington. There could be no more dangerous extension of centralization in the Federal government than to thus undermine the State utility commissions and State responsibilities."

Mr. Benton attacked the bill in like manner. "The holding company section," he said, "goes beyond the regulation of holding companies and imposes restrictions and regulations upon operating utilities, the operations of many of which are wholly confined to the several states, within which they operate. The other two sections of the bill the State commissions believe also go beyond the necessities of the situation, and would result in transferring from the local State commissions to Federal Commissions control of many matters which are now regulated locally and should continue to be so regulated.

. . . . . .

"If this bill is enacted in its present form, . . . and if it is constitutional, there is not an electric utility nor a gas utility in the land which may not be drawn within the regulations imposed by Title I."

As representing the owners of utility securities the position of Dr. Hugh S. Magill, President of the American Federation of Utility Investors, is too well known to require comment here. Suffice to quote him as follows: "The excuse for this bill is protection of the investor, whereas its certain result is destruction of the investor. The President, evidently ill-advised by certain 'brain-trusters,' declared in his special message that the passage of this bill would not cost the investor 1 penny. Yet, from March 9 to March 14, inclusive, covering a period just preceding and following his

message to Congress on March 12 in support of the bill, the values of listed holding-company securities declined $253,806,000, according to a special compilation by Standard Statistics Co."

We find no public demand for the destruction of holding companies or for government regulation, amounting almost to management of operating companies, but on the contrary a definite opposition to the proposed bill by a strong majority of the press and most thinking people. It is rather generally admitted that most of the real and fancied abuses of holding companies have been cured by the Securities Act of 1933 and the Securities Exchange Act of 1934. If any still remain they can and should be covered by appropriate regulation. Even Dozier A. DeVane, Solicitor of the Federal Power Commission says, "the holding company can be regulated." Why then are we thus attacked?

More and more clearly it appears that the true objective is not the correction of real or fancied abuses, but the undermining of the financial integrity and management of the utility industry, so as to facilitate its control and ultimate ownership by government without the payment of just compensation therefor. It is but a first step promoted by those who would like to socialize all industry.

John E. Zimmerman, President of The United Gas Improvement Company, in his annual report to stockholders on May 6 said: "The President . . . referred in his (radio) talk (on April 28) to 'war within the Public Utility Industry.' There is no war in that direction, except the bitter and unjust war that has been waged by government agencies under the leadership of the President, whose apparent purpose is to use this Bill as a step toward government ownership of all public utilities.

"And mark you, if this can be done with public utilities, the same thing can be done with any business which the administration may have in mind to acquire to further advance its impractical theories of national planning.

. . . . . .

"Even in the face of the failure of so many of his experiments, the President, in his radio talk, assured the people that 'the administration and the Congress are not proceeding in any haphazard fashion * * *. Each of our steps has a definite relationship to every other step.' It may well be asked whether it is reasonable or proper to ask the nation to accept on faith experiments of the New Deal which by sad experience are producing such results.

"But to return to the Wheeler-Rayburn Bill. The President also said—'This legislation will not only in the long run result in providing lower electric and gas rates to the consumer, but it will protect the actual value and earning power of properties now owned by thousands of investors who have little protection under the old laws against what used to be called frenzied finance.'

"It should be stressed here that this Bill is not directed exclusively at the holding company, for many of its lengthy and drastic provisions are devoted to centering in a bureaucracy at Washington the power of life and death over the operating companies. Let me assure you that these provisions make rubber stamps of the directors and managements of operating companies because of the strangulating character of the powers delegated to the Federal Agencies. The placing of final decision in matters of management in an Agency at Washington will increase the cost of operation, destroy the initiative of the local managements, and prevent improvements in business practices and developments in the engineering field. Furthermore, rates and other operating matters, which are within the sovereign rights of the States to regulate and control, are to be transferred to Washington, and the State Commissions are likewise to become rubber stamps.

"While the private electric industry is thus put into a strait-jacket, all federal and municipal plants are exempted from complying with any of the requirements of the Bill. This is in effect the very unfair and shocking proposition of putting the control and regulation of your business into the hands of your competitor. You must abide by the rules of the game, but your competitor, the Government, is foot-loose and fancy free, and because of its power given to tell you what you may or may not do—can throttle or strangle you as its competitor.

. . . . . .

"Now, how is it proposed to take away those powers which under our form of government are reserved to the States? This legislation proposes to take it away by stretching the Constitution in declaring that the use of the mails gives the Federal government jurisdiction over purely intrastate transactions and that such use shall be prohibited to any holding or operating company which declines to subject itself to the act, under a penalty of a fine of $500,000.

"I submit that if such a construction shall be given to the law of the land, then the Federal government can impose, whenever it has a mind to, upon any business in this country, any conditions or regulations to which it may be moved and the rights of the States to control their own corporations will vanish into thin air."

Socialization of the utility industry and perhaps of all industry clearly appears to be the ultimate objective. We see no reason for changing in any particular the views expressed editorially in the April JOURNAL.

Present informed opinion is that the Wheeler-Rayburn Bill will pass the Senate in drastic form. What action will be taken in the House of Representatives we do not know. But one bulwark of American Democracy remains,—the Supreme Court of the United States. On it our industry may well place its main hope of ultimate justice. Even if the Wheeler-Rayburn Bill should pass both Houses of Congress, the fight is just begun. It is unthinkable that an industry built up to such splendid proportions with the finest traditions of public service behind it should be destroyed by laws which have no rightful place on American statute books.

As if presaging what may happen, the Supreme Court of the United States on May 27 handed down three momentous decisions, which admittedly have thrown the whole New Deal program into confusion. In one of these the Court said in part:

"The Constitution established a national government with powers deemed to be adequate, as they have proved to be both in war and peace, but these powers of the national government are limited by the constitutional grants. Those who act under these grants are not at liberty to transcend the imposed limits because they believe that more or different power is necessary. Such assertions of extra-constitutional authority were anticipated and precluded by the explicit terms of the Tenth Amendement, 'The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.'"

May it not be that these three decisions by our highest court, strongly upholding the letter and spirit of the Constitution under which our Country has grown and prospered, may not mark the beginning of a second "Retreat from Moscow"?

When you buy pipe, get ALL THESE ADVANTAGES

1 COMPLETE UNIFORMITY. Uniformity, in NATIONAL Pipe, means uniformity of metallic structure, of ductility, of strength, of resistance to corrosion. It also means uniformity of diameter, of wall-thickness, and of surface finish

2 STRENGTH AND DUCTILITY. Strength and ductility to a remarkable degree are inherent in the steel of NATIONAL Pipe. Striking demonstrations of this have occurred again and again where the pipe was violently distorted by accident or was under abnormal stress in service.

3 THREADS EASILY. Smooth, strong, easily made threads are a marked advantage in using NATIONAL Pipe. This is due to unvarying quality of metal and to absence of slag inclusions, laminations, and blisters

4 FLANGES READILY. Expanding and rolling back of the metal for flanging is a real test of any pipe. To do this without loss of material, time, or labor is an experience practical men appreciate.

5 COILS AND BENDS WELL. In making coils and bends, there is both satisfaction and profit in knowing that the pipe you use has an extra measure of strength and ductility to meet the demands of unusually close and exacting work.

6 SOUND JOINTS. Workmen in field and plant who have welded or coupled thousands upon thousands of joints on NATIONAL Pipe, enthusiastically endorse it as their choice.

7 COPPER-STEEL. To meet very definite needs in dealing with corrosion and thus to widen the range of service of NATIONAL Pipe, National Tube Company introduced Copper-Steel Pipe to the industry twenty years ago. Therefore, NATIONAL is the original Copper-Steel Pipe.

8 SCALE FREE. The NATIONAL Scale Free Process, invented and developed by National Tube Company, is a method by which all NATIONAL Pipe (butt-weld sizes ⅛ to 3-inch) is freed of mill-scale, inside and outside, leaving a clean, smooth surface.

9 SPELLERIZED. This is another NATIONAL process invented and developed by National Tube Company. Blooms for pipe, 4 inches and under, are subjected to a special roll-knobbling or hot-forging treatment which so works the surface metal as to eliminate any irregularities and to produce a uniform, dense surface.

10 TESTED AND INSPECTED. Tests and inspections, the most painstaking, most thorough and most conclusive that can be applied, are maintained throughout NATIONAL plants. The result is a product on which the user may fully and safely rely.

CHROMATE TREATMENT—All NATIONAL Galvanized Pipe is given a special chromate treatment to resist discoloration and the formation of white rust. This patented process preserves that smooth glistening surface or metallic lustre which is characteristic of good galvanizing

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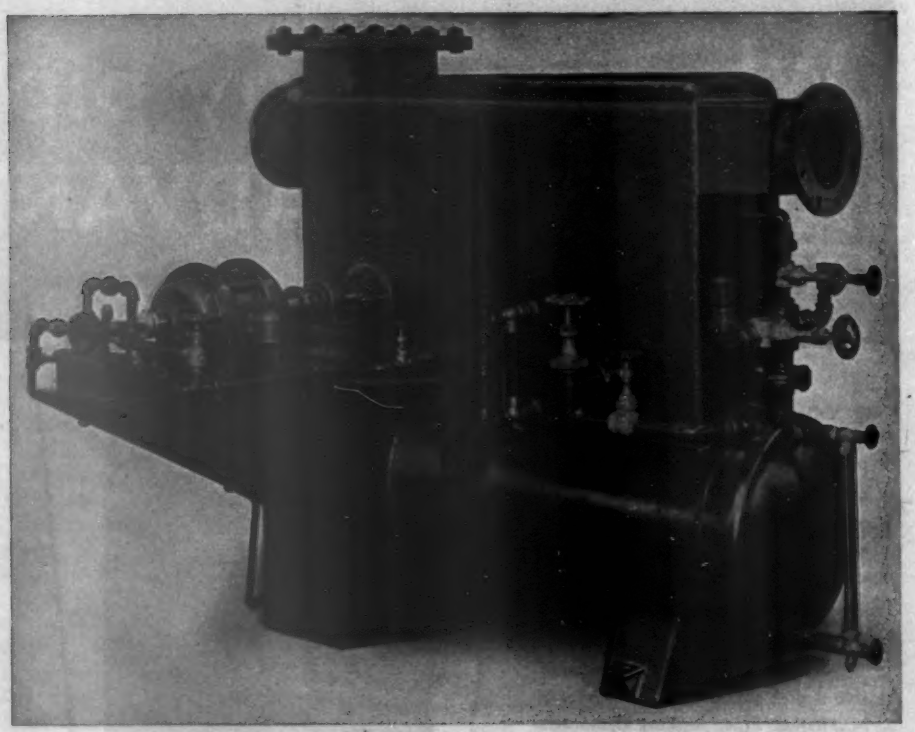
COLUMBIA STEEL CO., San Francisco, Calif.
Export Distributors
UNITED STATES STEEL PRODUCTS CO., New York, N. Y.
United States Steel Corporation Subsidiary

NATIONAL PIPE



New . . . and Different!

Sometimes it becomes necessary to design and build a piece of equipment different from anything ever created before, to overcome an operating or processing difficulty. Like the gas fogger illustrated, for example, which solved a gas distribution problem of first importance.

There is in every plant some replacing, rearranging or modernization of equipment that would cost considerably less to do than to leave undone. Semet-Solvay engineers are proficient in handling such opportunities for improvement and saving.

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AMERICAN GAS JOURNAL
JUNE 1935

Domestic Gas Utilization

Water Heating Section—Water Heater Types

By
Charles W. Merriam, Jr.
Div. Commercial Manager, Consolidated Electric and Gas Co.
Roanoke, Va.

REMEMBER the ancient allegory concerning the rashness of trying to break a whole bundle of sticks all at one time when little other than patience was required to break each stick separately one at a time? Thus it is with the seemingly obscure problems involved in essentially all domestic gas-fired water heating applications, because broken down into its minute parts the entire job is readily solved bit by bit which adds up to the proper answer. Let us then first tackle the major problem of getting a bird's-eye picture of the principal characteristics of the commonest types of heaters which are listed as follows:

1. Tank (sometimes called side-arm heater.)
2. Quick recovery automatic storage (sometimes called under-fired, or kettle, heater.)
3. Slow recovery automatic storage (sometimes called low demand or low input heater.) Several types are in common use; only the Convertible being illustrated here.
4. Automatic instantaneous (sometimes called continuous flow heater.)

Study the accompanying cross-sectional line drawings in connection with each of which is a word description of the method of operation. A competent salesman should be able to quickly reproduce a rough sketch showing the principal features of each of these four types.

Before progressing further distinction should be made between the water heating unit and the water heating system. The water heating unit is designated here as the burner, storage tank (if any), covering and all equipment immediately attached thereto other than the incoming cold and outgoing hot water lines. The water heating system is defined as including the foregoing heating unit and also all of the attached hot and cold water lines, faucets, etc., in fact, the entire water heating system. Of necessity the water heating unit must be studied separately as only an integral part of the entire hot water system.

Trusting that you have familiarized yourself completely with the general aspects of these four types of gas water heating units as depicted in the four illustrations, the following general discussion of the outstanding points of each is in order.

The *tank heater* is by a wide margin the type in commonest use largely by virtue of a lower first cost. This heater is manually controlled, the quantity of water heated and/or its final temperature being subject to the length of time the burner is allowed to remain in operation. The galvanized storage tank to which the heater is connected, is seldom insulated. Because heat is dissipated rapidly* through the uninsulated tank walls, the storage of hot water in a bare tank is highly uneconomical. Due to manual control of the burner and also to the bare storage tank, the tank heater places a premium on the human factor to heat just the right amount of water at the right time. More frequently than not, a greater quantity of water is heated each time the burner is lighted than is actually used or needed, thereby resulting in a waste of gas. This fact is one of the principal reasons why the tank heater in the normal domestic installation consumes more gas per gallon of hot water than the automatically controlled types.

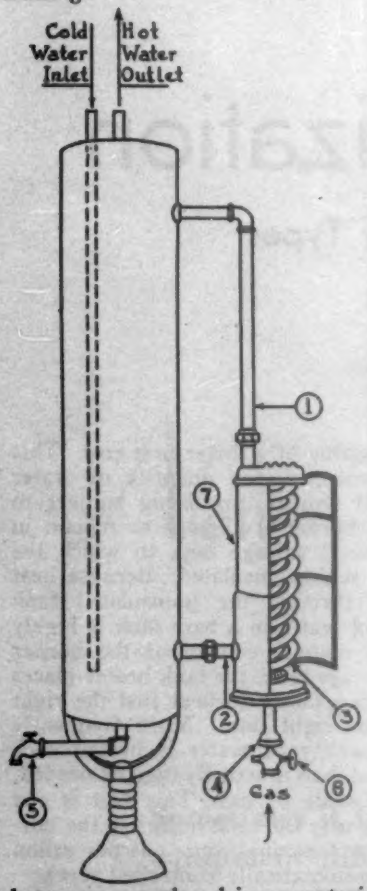
* The U. S. Dept. of Commerce established under their Simplified Practice Recommendation R8-29 the following as standard diameters and lengths (inside in.) from which have been computed the approximate storage, the sq. ft. of surface area and the hourly heat loss at an average of 80° F differential:

Diameter	*Length*	*Gal.*	*Surface, Sq. ft.*	*Heat Loss, Btu. per hr.**
12	36	18	11.0	1540
12	48	24	14.3	2002
12	60	30	17.5	2450
14	48	32	17.0	2380
14	60	40	20.8	2911
16	48	42	19.8	2772
16	60	52	23.9	3346
18	60	66	27.5	3850
20	60	82	31.0	4340
22	60	100	34.6	4839
24	60	120	38.3	5360
24	72	144	44.6	6240
24	96	192	57.1	7990

It is common practice to place the tank with the at-

** The foregoing is based on 140 Btu. loss per hr. per sq ft. of water tank surface, other temperature differentials being very nearly in direct proportion thereto.*

tached heater in the basement, although frequently installation is made in the kitchen, despite the unsightly appearance. The unhandiness of most tank heater installations often causes the housewife to employ her gas range for heating small quantities of water in a kettle, which is much less efficient thermally than the tank heater, a subject previously discussed as "teapot" heating.



Tank Water Heater

The flow of gas admitted at the point indicated is controlled manually by the gas cock (6). The proportion of air-gas mixture is adjustable in the usual entrainment tube (4). When the gas cock is turned on a combustible mixture emerges from the burner at the bottom of the copper water coil (3). Ignition is supplied by a match. Combustion taking place, the flame and hot gases envelop the exterior of the water coils (3). The ascension of these hot gases is retarded by a spear shaped, iron baffle (not shown in drawing) hanging downward on the inside center of the coil, thus increasing the length of time of contact. The coil, baffle and burner are enclosed in an exterior iron shell (7). The products of combustion are discharged at the top of the heater into a flue vent that is not shown here but is strongly recommended.

Upon the application of heat the water on the interior of the coil (3) rises up through the hot water pipe connection (1) to be discharged into the uninsulated, galvanized tank. Cold water flows naturally through (2) into the bottom of the coil (3).

When water is withdrawn from the tank at hot water outlet, as shown, cold water is admitted at the connection shown. Cold water is carried to the bottom to prevent cooling the hot water collected at top of tank. The drain valve (5) is for the cleaning of the tank and also serves as an additional hot water outlet provided tank is heated full to the bottom.

The thermal efficiency of the tank heater is dependent on, among other things, the effectiveness of the baffle and upon the extent of the copper coil surface exposed to the hot gases resulting from combustion. In practice coils range in length from 14 to 20 ft. and in diameter from 5/8 to 1 in. The longer the products of combustion stay in contact with the copper coils the greater will be the heat transferred into the water and, therefore, the less will be the heat losses escaping up the vent as evidenced by stack temperatures. Thus the length and size of the coils are important considerations. Certain mail order houses and short-sighted plumbers, in order to slightly reduce the initial cost of the heater, which incidentally is a small part of the total installed cost, sell tank heaters with short length and reduced diameter coils frequently of only "single" strength copper with the inevitable result of a dissatisfied gas customer. To offset the small hot water recovery capacity of these inferior tank heaters, the gas input must be increased beyond the designed rating. A properly constructed tank heater can burn efficiently from 20,000 to 45,000 Btu.* per hr. depending upon the designed size, the ordinary being 20,000 Btu. (35.2 cu. ft. of manufactured gas.)

At an assumed 65% thermal efficiency the ordinary tank heater will deliver at 80° F temperature rise (8.33 Btu. being the heat absorbed in raising one gal. of water 1° F) then $20{,}000 \times 0.65 \div 8.33 \times 80 = 19.5$ gal. per hr. delivered. Then if 10 gal. of hot water are required for a bath

$$\frac{6 \times 60}{19.5} = 30.8 \text{ minutes, or}$$

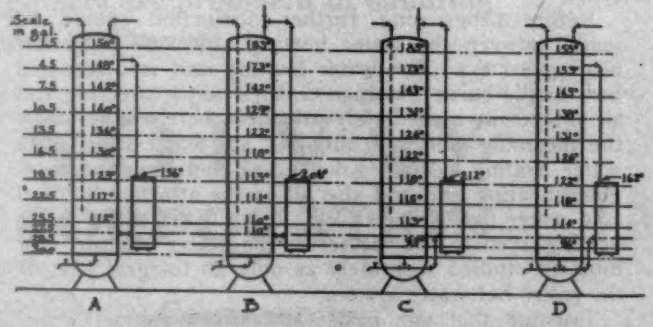
the time required with the burner on full to heat the necessary water for one bath with an ordinary tank heater.

An excessive amount of unburned gas impinged on the coils will set up a carbon monoxide condition that makes for both danger and inefficient combustion. Because of this, the possibility of a leaking gas cock, and to promote a cooler home, it is strongly recommended that all tank heaters be properly vented to a chimney or to outdoors with a suitable vent cap and flue.

The presence of copper coils in an intense temperature zone of long flames caused by a higher heat input than the design rating, accelerates the "liming up" of the tube interior, which becomes more rapid in proportion to the increase in temperature. In time this interior crusting of the water coils acts as an effective insulator, thereby diminishing the thermal efficiency. Even under normal water conditions tank heater coils have a tendency towards restricted water flow due to lime and scale deposits. This difficulty is eliminated in some measure in the internally fired automatic storage heater because of the larger area of heat transfer.

Due to draft through the heater and up the flue, cooling of the stored water (when the burner is off) is hastened by the natural circulation of water in a reverse direction back through the copper coils.

Reasonably constant hot water temperature at the point of use is a characteristic inseparable from good service. Even with the most advantageous piping hook-up of a tank heater, (see diagram below) fluctuations occur.



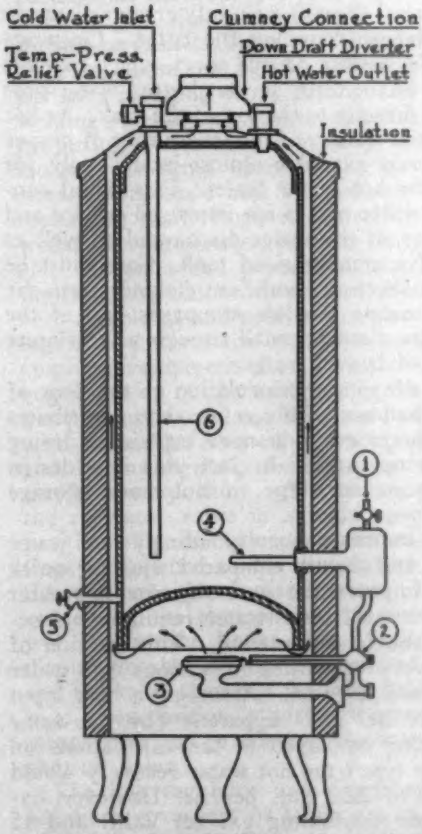
Temperature variations in a galvanized tank due to four different piping hook-ups of tank gas heater with a 25,000 Btu. input burner Method A is recommended

* *The latest type of range burner when on full burns roughly 9,000 Btu. per hr.*

Observe in the foregoing that methods A and B provide a space in the tank below the point of water entrance into the attached heater thus allowing for sediment accumulations and also aiding in keeping the coils cleaner.

Now that we have appraised most of the faults why the popularity? The tank water heater by supplying a cheap means as to original cost furnishes a real need for hot water in the present market. The service afforded is admittedly cumbersome, intermittent and higher in gas cost per gal. of hot water delivered, but nevertheless the tank heater is to be reckoned with and serves a distinct need for families of very limited means.

The *QUICK RECOVERY AUTOMATIC STORAGE HEATER* (kettle or underfired type) will supply hot water from storage at a turn of the faucet up to the limits of its capacity at any time, day or night, and at a temperature controlled by a so-called thermostat, thus relieving the owner of manually lighting and extinguishing the burner coincident with hot water requirements. This is characteristic of any automatic water heater sometimes descriptively styled "self-action." Automatic heaters differ from the manually controlled type in that three distinguishing mechanical devices are employed, namely the thermostat, safety gas shut-off, pilot light and usually the temperature-pressure relief valve, all of which will be described in a later article.



Quick Recovery Automatic Storage Gas Water Heater

Gas connection is made at (1) where main cock may be manually turned on or off. If water in tank is less than temperature setting of the thermostat (4) gas will travel automatically through body of same to main burner (3). When water reaches thermostat setting the gas valve turns off. Gas for constant burning pilot light (2) by-passes the thermostat valve, insuring ignition of combustible mixture at main burner head (3) in the combustion chamber under the tank. Flame and hot gases transmit heat through the tank into water.

Products of combustion pass along the under and the side surfaces of tank in ascending the circular pasageway between tank and insulated outer walls, to reach the chimney connection, as shown.

If the pilot light is extinguished for any reason the automatic safety gas shut-off valve at (2) becomes operative in closing off the gas supply to the main burner.

The temperature-pressure valve automatically opens in event of any failure of water temperature thermostat valve (4).

Water inlet is as shown conducting cold water to bottom of tank when hot water is withdrawn at outlet at top as shown. The drain (5) is for cleaning and extra water tap.

A storage water heater is classified by common acceptance, as "quick recovery" when heat input is at the rate of 15,000 Btu. per hr. or greater. The majority of the quick recovery storage heaters in operation are between 20,000 and 30,000 Btu. input. Heaters with less than 15,000 Btu. per hr. input are commonly called medium or low recovery units.

In the kettle type of automatic equipment the heat first strikes the water tank at the bottom, which is usually concave in shape, forming a sort of combustion chamber with intense temperature. A large portion of the heat is here transferred into the water. Heat absorption continues through the side walls of the tank, the unabsorbed portion of the products of combustion being discharged at the top to the chimney. The latter heat, of course, is not converted to "useful work," and hence is wasted. The hot gases ascending along the side walls are enclosed by an insulated outer jacket acting as a flue which, in addition to keeping the products of combustion in contact with the side walls of the water tank, also serves to prevent or at least greatly diminish the dissipation of heat to the room both when the burner is in operation and when the thermostat has caused the gas to be turned off.

When the main burner is cut off the constant burning pilot light, in addition to giving sufficient heat to keep the safety shut-off gas valve open also liberates a certain amount of heat into the combustion chamber. It is obvious that when the main burner is not in operation the direction of heat flow is reversed so that heat is discharged from the water in the tank back through the bottom, side wall and top thereby heating the surrounding air in the flue and hence passes up the chimney. Cooler air comes in at the bottom of the heater, around the burner and secondary air ports. The pilot light is supposed by many to temper this incoming air drawn in by the natural draft thus created. Some of this released heat filters out through the insulation and outer wall jacket to escape into the room. The general process is known as "standby loss," which is larger on the quick recovery storage heater than in the other two types illustrated.

The recovery capacity which, of course, refers to the speed with which a volume of water is elevated through some known temperature rise, is, in this type of heater, relatively quick, as the name indicates. A simple example is worked out here thus: Since 8.33 Btu. are required at 100% efficiency to raise 1 gal. 1°F, and assuming a thermal efficiency of the heater to be 74% and the temperature rise to be 80°F, then for a heater having a 20,000 Btu. input per hr.:

$20{,}000 \times .74 \div 8.33 \times 80 = 22.2$ gal. or the approximate recovery capacity per hr.

At this point it is significant to note that assuming the average withdrawal of hot water from the above heater

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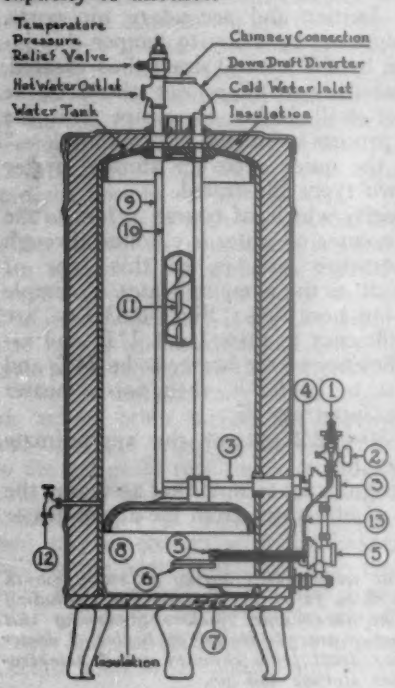
* *Standby losses at no withdrawals during an entire month will require from 20 to 65 cu. ft. of 525 Btu. per day (including pilot light input.) The three chief factors governing this wastage in actual practice are: 1. design of heater, 2. water withdrawals, 3. effective draft from chimney and 4. temperature differential between storage and air.*

to be 50 gal. in each 24 hr. period then 50 ÷ 22.2 = 2.25 or 2 hr. and 15 min. in each day is the time required for the burner to be in operation to heat up this amount of water. But to this must be added the burner time necessary to offset the standby losses.* In other words, for 2 hr. and 15 min. the burner will be consuming at the rate of 20,000 Btu. per hr. solely for the purpose of heating up the water initially; however, this is not the total heat or gas required because during 24—2.25 or 21.75 hr. the water tank is wasting Btu. or equivalent gas into the flue which is not useful to the purpose in view and is, therefore, a wastage that must be overcome by the supplying of additional gas heat.

The *CONVERTIBLE AUTOMATIC STORAGE HEATER* is employed usually as a slow recovery unit, that is, from 2,500 to 9,000 Btu. per hr. input although the design is such as to permit alternations for a higher heat input. This low gas demand and the center or internal flue with spiral baffling are essentially all that distinguish this type from the usual quick recovery.

The area of the center flue being considerably less than that of the entire tank does not expose as much surface for heat dissipation during standby periods as in the kettle type of quick recovery heater, a fact which tends to reduce "standby losses" with the Convertible Heater.

The spiral baffle in the center flue is for the purpose of retarding the flow of the hot gases by offering resistance to the natural upward draft, thus tending to offset the reduced surface available for heat transfer. This draft obstruction, or baffle, is so designed as to afford the proper draft to just carry off up the chimney the products of combustion of the rated gas input with a reasonable margin of safety when the burner is turned on. The engineers very aptly style this increasing the sojourn of the hot gases, thus permitting transfer of the maximum possible amount of available heat to the water and, consequently, bringing about minimum stack temperature. These spiral baffles are built in segments so that lengths of the baffle may be removed as the heat, or gas, input is increased, thus creating proper draft conditions as the heater is converted from one recovery capacity to another.



Convertible Automatic Storage Gas Water Heater

Gas connection is made at (1) which by cock (2) may be manually turned on or off. The flow of gas off or on to main burner (5) is controlled automatically with relation to the temperature of the water in tank by the thermostat (3), which temperature control point may be adjusted up or down (4). Gas for constant burning pilot under rod (5) is bypassed around thermostat (3) by tube (13), thus insuring ignition of gas-air mixture in combustion chamber (8).

Burned gas gives up most of heat to water through the bottom of the tank, then ascends center flue tube (10) properly baffled (11)) to chimney connection.

By slipping in proper burning equipment (6) variable heat input may be had from 2,500 Btu. to 20,000, thus governing speed of water temperature recovery. The spiral baffle (11) is assembled in removable segments so that proper draft conditions may be obtained at variable heat inputs. The opening at (7) is for secondary air to support combustion at 20,000 Btu. rating.

Sheet steel cylinder (9) surrounding flue tube (10) has opening at bottom to aid heated water to proceed immediately to top of tank for discharge at hot water outlet.

If the pilot light is extinguished for any reason the automatic safety gas shut-off valve at (5) closes off the gas supply to main burner. In event of failure of thermostat the temperature-pressure relief valve becomes operative.

In connection with this center flue there is another possibility worth mentioning; namely, that of insulating the water tank on top. The importance of this can be appreciated readily when it is considered that hot water rises upward and gathers at this point, thus insulating the top gives protection against heat loss at the most valuable location.

Note the cylindrical sheet of a slightly greater diameter than the center flue surrounding the latter. Openings are provided in the bottom of this sheet, which extends almost to the top of the tank, so that heated water proceeds as a stream directly to the top of the tank. As hot water accumulates at the top of the tank a zone of proper temperature water is available almost immediately for service through the hot water outlet. This initial concentration of hot water makes for improved service and evener temperature of the water discharged as well as permitting use of a smaller sized tank. Care must be taken to have this sheet at a sufficient distance from the center flue to eliminate possible stoppages and at the same time have the distance small enough to accelerate the upward flow of heated water.

Observe in the drawing the insulation on the floor of the combustion chamber. This refinement contributes substantially to increased economies especially during periods of burner operation. In fact, this is a design feature adaptable to any type of automatic storage heater.

Low gas input implies a correspondingly low water recovery capacity and, hence, compared with the quick recovery heater, imposes the necessity for a greater storage in order to meet large water requirements occurring during a short time interval. This relation of storage and recovery capacities to various hot water demands is discussed later on. Assuming a heat input of 4,500 Btu. per hr. it is apparent (by the same process of reasoning employed in the calculations on the quick recovery type) the hot water recovery would be 5 gal. instead of 22.2 gal. per hr. However, instead of the burner consuming gas for 2 hr. and 15 min. per day as on the quick recovery type, the burner time on the slow recovery would be 10 hr. This means that instead of 21.75 hr. standby the idle time would be only 24—10 or 14 hr., with the slow recovery type, thus substantially reducing the length of time in which the standby losses are taking place. Offsetting in part this source of increased efficiency is the slightly greater

(Continued on page 52)

Gas Pressure Controls

INSTALLATION OF LINE REGULATORS

By

Erick Larson

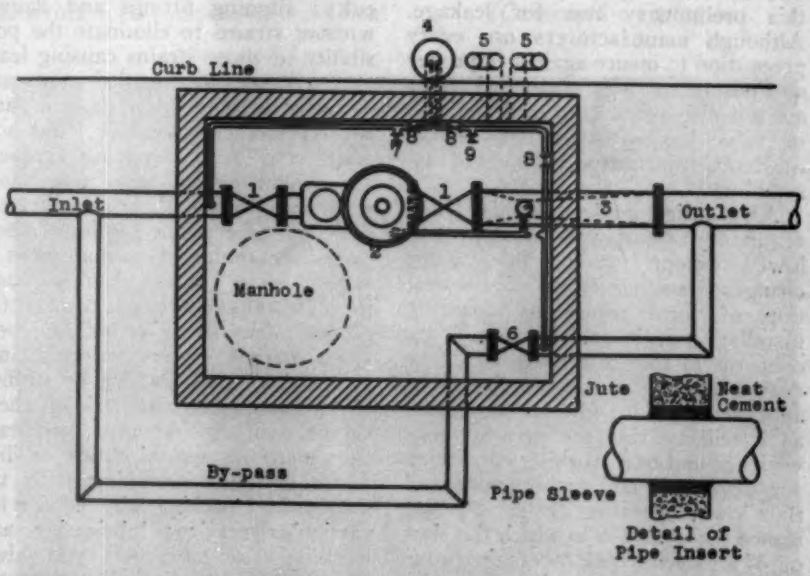
Gas Engineer

THE installation of a line regulator should provide not only an economical and neat construction job but also ample and convenient room for operators which will facilitate repairs and minimize troubles. Since the most common cause of poor service in line regulators is foreign matter causing improper functioning of the valve, particular care should be taken to exclude all loose particles from the interior of any pipe fittings or parts of the regulator. A careful installation of mains may practically eliminate such sources of foreign particles as the improper and excessive use of joint compounds on threads or gaskets, burrs on the ends of pipe, loose or lightly adhering particles resulting from cutting and welding operations, gasket material projecting inside where it may be loosened or acted upon by the gas stream, mill scale and internal corrosion not easily loosened but which would become disengaged with time, etc. As an added precaution after the line regulator installation has been completed and previous to placing in operation, the regulator and auxiliary equipment should be thoroughly blown out by using air or the gas pressure in the transmission line with the outlet shut off valve open and the line regulator held in a completely open position. To maintain the regulator valve in a wide open position shut off valve and connections are opened to the atmosphere, the auxiliary bowl disconnected if one exists, the shut off on the control line to the under side of the diaphragm shut off or disconnected, and the valve stem mechanically held in an open position by wiring or other means previous to opening the inlet shut off valve.

The line regulator and accessory auxiliary governors or bowls are installed level to prevent binding of connecting stems, binding of the valve stem, angularity of the valve and improper functioning of any part of the mechanism which would be affected by any other position than one truly horizontal or vertical.

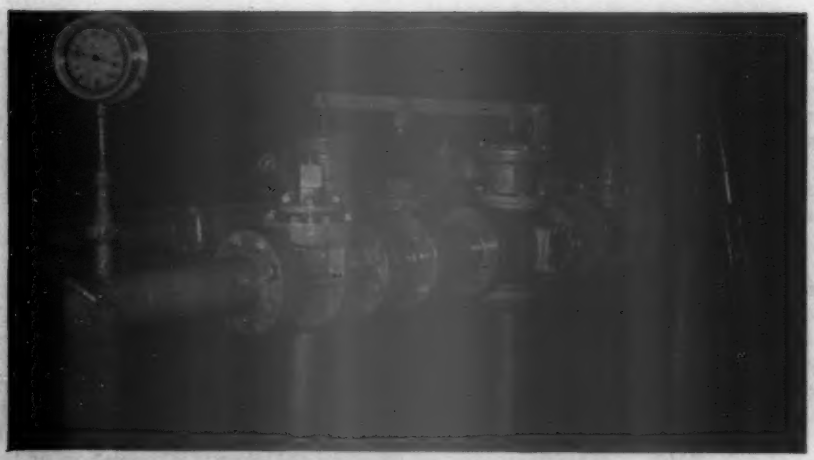
Final Checking

Binding of any of the connecting rods or stems comprising any part of the line regulator or its auxiliary equipment are usually individually checked by disconnecting each from springs, lever arms or other restraining parts of the mechanism and hand operating to determine freedom of movement. The final check should be with as large a proportion as possible of the line regulator and its auxiliary equipment connected and in an operating position as the checking will then include a determination of freedom of movement of all hinges and connecting links as well as the binding of stems against guides. As an additional precaution after the line regulator has been completely connected the inlet shut off valve should be permitted to remain in an off position and the outlet valve slowly opened and closed several times allowing the careful observation of the functioning of the line regulator through several cycles of operation. When the outlet pressure is temporarily lower than the desired lock up pressure the counter-balancing force is decreased sufficiently to secure a lockup. When the regulator is being connected to a system not yet containing gas the checking may be accomplished with the use of a portable air compressor to maintain the outlet pressure. The advantage of a test previous to putting gas in a system is that no delay will be experienced due to improper functioning of the line regulator after purging.



Standard Line Regulator Layout Followed by One Company. Desire is to Minimize Pit Size.

1—Plug Valve. 2—Balanced Valve Regulator. 3—Pressure Booster. 4—Pressure Station. 5—Vents to be installed inside curb line. 6—Gate Valve. 7—¼" Gate Valve. 8—¾" Lubricated Plug Cocks. 9—¼" Hose Cock.



Regulator Station with Plug Valves. Note Large Ratchet Valve Key Which is Part of Station Equipment.

Checking Shut Off Valves

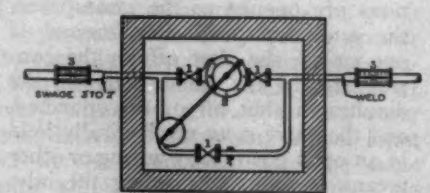
Shut off valves used in connection with regulators should be checked both for leakage and operation previous to actual installation. This test is accomplished by blanking off both valve flanges or plugging the screwed ends and connecting one side to a source of air or preferably gas pressure, then operating the valve under as near the field conditions as possible and also checking for leakage through stuffing boxes, joints, fittings, and porous castings. The testing for porous castings is frequently neglected although porosity is often the source of small annoying leaks after installation. Auxiliary equipment and the line regulator may also be advantageously subjected to this preliminary test for leakage. Although manufacturers use every precaution to insure against improper and porous castings many such flaws are not discovered until the regulator or valve has withstood the shocks incidental to transportation and assembling.

As a design guide a standard line regulator assembly is usually followed except for possible minor changes resulting from an observation of local conditions. During installation it is seldom possible to conform to the exact outline of the design and all alterations should be approved by those who are to operate as it will provide the greatest convenience and best working conditions for inspection and maintenance and thus lower operating costs. For instance the direction in which the shut off of a valve or cock faces; the proximity of such valves and cocks to the position of the repairman when making repairs which would require the use of such valves or cocks; the placing of bolts on flanges and slip couplings to facilitate removal by a repairman rather than in the most convenient location for the installer; careful grading and finishing of the floor when of concrete or brick to prevent the accumulation of pools of water where a repairman or inspector would naturally stand; providing bolts with proper threading; matching companion holes in flanges and handhole plates so that no forcing of the bolts is necessary; properly protecting all metal to metal contacts against corrosion to facilitate removal which would include the proper use of joint compounds on all bolts, securing of fittings, valves and other parts ordered from the field of the same standard used by the operating unit; setting valves so that keys when used can be placed without any difficulty; aligning fittings and flanges without strains to eliminate the possibility of those strains causing leakage on flanges or threaded joints and to facilitate removal of flanged parts for replacement; locating hand hole plates and parts requiring frequent adjustment or attention where observation of repairs are facilitated; providing special precautions where corrosion is apt to be a maximum as might occur where mains come through walls or at the surface of the ground; eliminating as far as is possible surface waters entering into pits; checking all packing or stuffing boxes such as on gate valves, check valves with outside arms, auxiliary equipment or special types of line regulators and repacking with the standard of packing adapted for the particular service; lubricating and working in of lubricated type valves or cocks and leaving the lubricated type of shut off with lubricating channels filled; weighing and marking on individual weights the value in pounds or other weight units; manufacturing and leaving special keys where the regular valve keys can not be used; providing the proper size adaptors on valves not having the standard size shank required for valve keys; are points although by no means all, on which the excellence of workmanship and experience of the field construction supervisor may be judged and economy of operation and maintenance increased. An installation in a pit requires more experience to secure satisfactory maintenance and operating conditions as it is seldom possible to determine the exact nature of structures to be encountered and, therefore, the frequency of changes from designs are more numerous. Sub-surface conditions also increase the sources of trouble such as from surface waters, dampness, the necessary crowding of equipment over that usually experienced in above ground housing, poorer illumination, adverse ventilating, increased hazards for workmen, and increased hazards for pedestrians and vehicular traffic.

Every construction foreman will provide safe working conditions for the installation crew. A representative of the operating crews should be present during construction to assist in all matters, one of the most important being to secure a structure and apparatus providing the highest degree of safety for inspectors and maintenance men. Many accidents have occurred in sub-surface regulator pits particularly older designs which simple precautions during construction could have avoided.

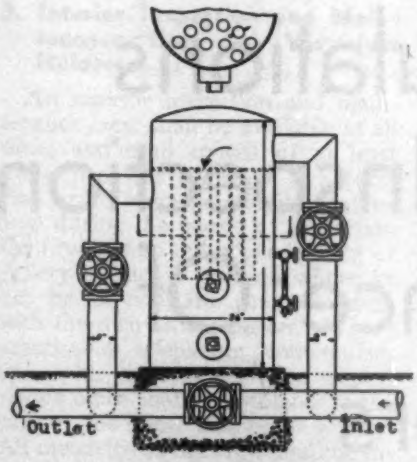
Layout of Controls

The purpose of design should be to provide regulating equipment which will furnish the best quality of regulation to render proper consumer service, equipment requiring a minimum of attention and repair, safe working conditions, minimum haz-



Another Standard Layout for Line Regulators. Full Sized Mains Are Not Brought Into Pit and Slip Couplings Are Outside of Structure.

1—Plug Valve
2—Balanced Valve Regulator
3—Slip Coupling
4—2"x4" Wood Support



Design of an Oil Scrubbing Foreign Matter Remover Used on a Natural Gas Line.

ards to the public, sufficient but not excessive capacity, and avoid the disadvantages of an initially cheap installation. Design is not usually attempted until after the location has been selected as each location may necessitate particular alterations to the standard design but general principles will be found similar in practically every distribution control design.

The nature of the gas received from the transmission line may require equipment for the removal of foreign matter. When the controls are to be located in a building and above ground there is usually sufficient space to install the common types of foreign matter removers outside of the building and above the surface. The design of the removers will depend entirely on the quantity and nature of the foreign matter to be extracted and is a specialized field particularly when dealing with large quantities of foreign material. Dust eliminators or removers are either of the dry or liquid types although for specialized work electric precipitators may be used.

When dust removers are employed it is usual to provide shut off valves on the inlet and outlet together with a by-pass. The shut off valves installed on the dust removers if located outside of a control building provide a safety feature as the valves will be accessible when entrance can not be gained to the control house or pit. When such preliminary equipment is not installed a common practice is to provide shut off valves on both the inlet and outlet of controls accessible for operating without the necessity of entering a building or pit the purpose being to provide a means of completely cutting off all gas supply to the controls. On high pressure transmission and distribution the lubricated plug type of shut off valve has been found preferable for these locations. When the controls are in pits located in highways dust removers are usually placed in the pit with the regulating equipment.

The removal of liquids although less frequently necessary usually requires equipment greater in size than dust eliminators. At control locations practically the only type of liquid removers used employ baffles. The more common type is a regular baffled drip which will also remove much of the dust carried in the gas stream. Such drips are often installed ahead of regulators as standard practice to prevent any larger pieces of foreign matter accidentally left in mains from reaching the controls. Such drips have a limited capacity so that for the removal of large quantities of liquid or foreign matter a tank of at least ten or fifteen times the diameter of the main is installed and baffled to secure a low gas flow velocity which allows foreign matter to drop out of the gas. Liquid removal is seldom a factor at controls as the majority is removed at compressor stations or well heads and the continual dropping of pressure lowers the dew point.

Instead of baffles placed at right angles to the gas stream another type by spiral baffling causes the gas to take a rotary path and particles of solid or liquid matter are thrown to the sides by centrifugal force.

When more complicated equipment than a standard drip is required for foreign matter removal manufacturers of such special equipment should be consulted. Attempts to construct such equipment in the field especially by the use of hair, felt, rags or other straining material have occasionally resulted in complete stoppages. One general safety principle in foreign matter removers design should be to provide a large free space in which the gas stream may be caused to change direction or rate of flow but not be restricted by solid matter even though that matter may be initially porous. In most instances the foreign matter collected may be removed by installing a blow off pipe at the lowest point of the collection chamber and leading to a convenient location for handling the material. Such a method is preferable to isolating the apparatus from the main and removing the material through man holes.

Use of Water Proof Corrosion Resisting Material

The incasing of all pipes entering or leaving the masonry walls or floors of pits or control houses and filling the intervening space between pipe and casing with water proof corrosion resisting material will minimize replacement of pipes due to corrosion failures, provide a flexibility valuable during installation in minimizing construction strains on flanges and fittings, facilitate removal of pipe for such purposes as changing the size, minimize troubles from water seeping into pits or buildings at such locations and allow undelayed construction.

Often the controls are completely assembled previous to the erection of pits or houses and in other cases walls and floors are partially constructed

(Continued on page 58)

Regulator Station Designed for Convenience in Operation and to Facilitate Changes. Vertical Installation to Conserve Space in an Existing Building. Gauge Connections Have a Tee Above Line to Recording Gauge for Temporary Gauge Connection.

Rules And Regulations Pertaining To The Inspection And Maintenance Of Gas Holders

State of New York
Department of Public Service
State Division

IN THE matter of the Proceeding on motion of the Commission (1) to investigate and determine the methods and practices of gas and of gas and electric corporations with respect to the use of gas holders and (2) to determine whether rules and regulations with respect thereto should be prescribed. (Case No. 8429.)

The Commission having made such investigation, ordered as follows:

1. That the attached rules and regulations pertaining to the inspection and maintenance of gas holders be and they hereby are adopted and prescribed to be effective on and after June 1, 1935.

2. That on and after June 1, 1935 every gas corporation and every gas and electric corporation is hereby directed and required to comply with the said rules and regulations.

3. That this order shall take effect June 1, 1935. By the Commission.

1. Supervision

All inspections and maintenance shall be under the personal direction of competent engineers or supervisors designated by the responsible operating official.

2. Forms and Reports

All pertinent data obtained as a result of an inspection shall be entered on forms appropriate for the purpose. These reports shall receive the prompt attention of the responsible operating official, who shall issue the necessary instructions when the data in the reports is indicative of conditions requiring immediate attention. Instructions so issued shall form part of the permanent records of the company.

3. Fences and Enclosures

Holders shall be protected by suitable fencing or other adequate means shall be provided for preventing access to holder structures by unauthorized persons.

4. Fire Protection

A suitable number of fire hydrants shall be located at a distance of not more than 500 feet from the holder shell to insure an adequate supply of water in case of fire, excepting in outlying territory where no water supply is available and/or where there are no buildings within 300 feet of the holder. No permanent buildings shall be erected on company property within 100 feet of a holder shell, except buildings of fire resisting construction and no gas, oil or other highly inflammable material (except lubricating oil) shall be stored therein. All gasoline tanks for use of company vehicles shall be placed underground; no temporary structures shall be erected at a radial distance of less than 50 feet from the holder shell; no combustible material of any kind shall be stored in a temporary structure of wood or other inflammable material.

5. Access to Waterless Holders

The doors on stairways and external elevators leading to top of holder shall be locked at all times. The doors shall not be unlocked except by authorized employees. A separate set of keys shall be kept in a definite location available to authorized employees for use in cases of emergency.

6. Exterior and Interior Elevators —Waterless Holders

A test and inspection of the exterior and interior elevator safety devices, cables, hoists, rope baskets, drums, sheaves, etc., shall be made at least once a year by trained elevator inspectors not connected with the company or any of its affiliates. An inspection of the exterior elevator shall be made at least once a week by the company. Inspection of interior elevator shall be made as outlined herein under "Interior Inspections—Waterless Holders."

7. First Aid and Protective Equipment

All Waterless Holders shall have as a minimum the following items of equipment readily accessible at the specified locations:

(1) Two pieces of self-contained oxygen breathing apparatus of a manufacture approved by the United States Bureau of Mines located as follows:

One on upper platform or balcony.

One on piston.

(2) Four fire-proofed woolen blankets located as follows:

Two on upper platform or balcony.

Two on piston.

(3) A sufficient number of extra oxygen cylinders shall be readily available on the holder or adjacent thereto.

8. Interior Inspection and Maintenance Crew — Waterless Holders

An interior inspection and maintenance crew shall be available at all times and shall consist of at least three men, one of whom is a foreman or his immediate assistant. One man during the period of inspection shall remain on the upper landing or gallery in such a position where he can be in constant communication with the men on the piston. Where practicable telephonic communication with the engineers or supervisor's office shall be available to the man on the upper landing or gallery. All members of the crew shall be instructed and periodically drilled in the Schaefer method of resuscitation.

9. Preliminary Precautions Before Entering Piston Chamber

Employees before entering or descending to piston chamber shall satisfy themselves that the motor driven elevator, hand operated safety hoist and folding ladders, are in a proper operating condition and that all items described herein under "First Aid and Protective Equipment" are at their specified locations.

If any item of the mechanical apparatus is not operating properly, no descent to the piston shall be made until the item is placed in proper working order. The safety basket on the hand operated safety hoist shall be ready for immediate use before descending to piston.

10. Tar Pumping Equipment — Waterless Holders

Tar and skimmer pumps, including electrical equipment, tar conditioners and tar pipe lines shall be inspected at least once a week for necessary repairs and adjustments. Riser pump run indicators, switches, float rods, and gears of timing device shall be examined and inspected daily. Emergency drives for pumps shall be tested at least once a month to insure immediate availability for service. Records of pump runs shall be taken at least once a day.

11. Interior Inspections—Waterless Holders

Interior inspections shall be made at least once a week and shall in general comprise the following:

Inspection of skylight glass on holder top.

Inspection of lenses in flood lights.

Examination of tar in seal to detect presence of oil and water.

Inspection of piston guide rollers, rubbing bars, and levers for proper lubrication and freedom of movement.

Inspection of sealing or packing rings.

Measuring position of piston to determine piston level.

Inspection of motors, drums, cables, sheaves, safety baskets, and lubrication of motor elevator and hand operated elevator.

The depth of cup tar in each alternate bay shall be measured daily. If the atmospheric temperature is below 26 degrees F., the condition of tar in seal shall be examined at least every day. The tar in the cup and dam shall be sampled and analyzed at least once a week. When the piston of a waterless holder is of the flexible seal ring type an adequate supply of suitable anti-freeze liquid shall be stored on the piston to insure the prompt removal of any frost and ice that may form on the inner surface of the shell during cold weather.

12. Atmosphere Above Piston—Waterless Holders

At least once each week a test shall be made of the quality of the atmosphere above the piston. Smoking and use of devices of any kind that might ignite an explosive mixture shall not be permitted in the piston chamber. All electric lights in space above piston shall be of the vapor-proof type. Electric motors, electric wiring and devices for all uses shall be in accordance with the Fire Underwriters requirements.

13. Holder Connections and Piping

Valves for connections to holders including relief valves for pressure tanks shall be inspected and tested for opening, closing and leakage at least twice a year. All necessary adjustments and repairs shall be made to restore each item to a high operating efficiency. Gate valves on inlet and outlet connections shall be tested for free movement, and inspection for lubrication of stems and condition of packing at least once a week. Where practicable, control valves shall be provided on inlet and outlet connections at a point distant from the holder, and inlet, outlet and by-pass valves shall be motorized. All piping in proximity to holders shall where practicable be placed underground.

14. Pressure Tanks—Foundations and Supports

An annual examination shall be made of foundations and supports for all pressure tanks to ascertain if all saddles and piers are fully supporting the tank. Any settlement which will produce additional structural strains shall be corrected at once.

15. Interior Inspections—Water-Seal Holders

After a long period of continuous use, not to exceed twenty years, physical tests shall be made upon specimens cut from the thin material of the crown plating, or after a period of continuous service, not to exceed twenty-five years, the tank shall be de-watered and a thorough interior inspection made of the condition of the shell, steel work, the internal rollers, and the permanent frame. The holder shall not be restored to service until the necessary preliminary precautions and the repairs as indicated by the inspection have been made.

16. Holder - Cups — Water - Seal Holder.

The temperature and depth of water in cups shall be recorded at least twice a day during freezing weather. Holder-cup heating apparatus shall be inspected at least twice a day when in operation. During non-freezing weather the depth of water in cups, shall be recorded at least once a day.

17. Exterior Inspections — All Holders

An inspection of the exterior of all holders shall be made at least once a month to ascertain the condition of paint, shell, framing and holder top. Guide rollers on water seal holders shall be inspected for lubricating, alignment, and clearance at least once a month. During winter months a crew shall be available to insure prompt removal of any unsafe accumulation of snow and ice on the top and other parts of the holder.

18. Cutting, Welding and Caulking

The use of cutting and welding apparatus shall not be permitted on equipment used for the storage of gas or apparatus accessory thereto until permission has been obtained from the operating engineer directly in charge of the work who shall verify fully if all the necessary precautions against fire and explosion have been taken. A pressure tank shall not be caulked with air tools until the pressure within is less than five pounds.

19. Purging

The purging of Water-Seal Gas Holders, Waterless Gas Holders and Pressure Holders preparatory to ex-

(Continued on page 58)

Renewing Services Under Paved Streets*

By

W. L. Ruchworth

Philadelphia Gas Works, Philadelphia, Pa.

THE Street Division of our Company has found it economical as well as practical to renew ¾", 1" and 1¼" services with new 1¼" pipe by making an opening not larger than *one foot square* over the main. This method is used on cast iron main system with steel services, carrying pressure within the range of 3" to 6" water. The conditions under which this work can be done are as follows:

1. Where the main is not more than 3 feet deep.
2. Where the total length of the service is 40 feet or less.
3. Where the service to be renewed is straight, with no offsets in the line.
4. Where the service terminates in a basement with approximately 20 feet clear space in line with and beyond the head of the service.

Details of the tools referred to in the following description are shown in the sketches reproduced herewith (Figures 3 and 4).

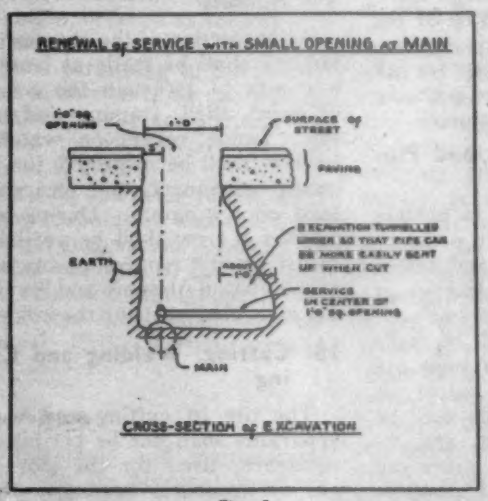

RENEWAL of SERVICE WITH SMALL OPENING AT MAIN
1'0" SQ. OPENING
1'-0"
SURFACE of STREET
PAVING
EXCAVATION TUNNELLED UNDER SO THAT PIPE CAN BE MORE EASILY BENT UP WHEN CUT
EARTH
SERVICE IN CENTER OF 1'0" SQ. OPENING
MAIN
CROSS-SECTION of EXCAVATION

Fig. 1

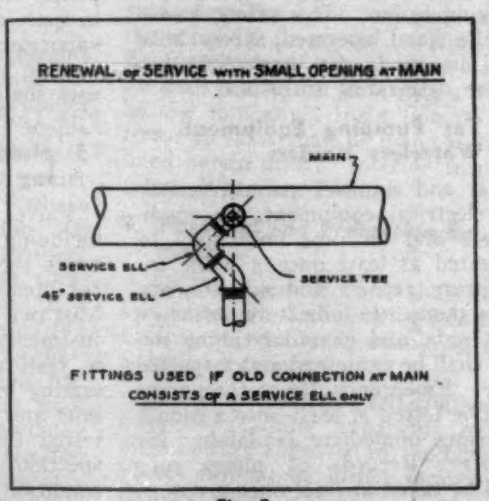

RENEWAL of SERVICE WITH SMALL OPENING AT MAIN
MAIN
SERVICE ELL
45° SERVICE ELL
SERVICE TEE
FITTINGS USED IF OLD CONNECTION AT MAIN CONSISTS of A SERVICE ELL ONLY

Fig. 2

After breaking a one-foot square opening in the paving, the excavation to the main is made by using the "Post Hole Digger" and "Spoon Shovel." An ordinary tunneling bar and a pneumatic spade can be used to advantage to loosen the earth so that it can be easily removed with either the "Post Hole Digger" or "Spoon Shovel." Figure No. 1 shows the completed excavation. If the old connection at the main consists of a service tee, service ell, and plug, the plug is removed from the service tee by using the "Key Wrench." The "Stopper" is inserted in the tee and tightened to stop the gas flow through the service.

The service pipe is then cut off about 4" in front of the service ell with the "Pipe Cutter." If the service pipe is in poor condition and the cutter tends to crush the pipe instead of cutting it, the "Hack Saw" is used. The "Fork" is then used to remove the service tee, ell, and short 4" piece of pipe from the main. A new service tee and ell, made up, and with a "Stopper" inserted in the tee, are screwed into the same tap hole, using the "Fork" to tighten the fittings into the main. If the connection at the main consists of a service ell only, the service is cut in the manner described above. The service ell and 4" piece of pipe are turned sufficiently with the "Fork" to allow a wad of tallow muslin to be stuffed into the cut end of the pipe to prevent any escape of gas. The connection is then removed with the "Fork." In replacing such a connection it is necessary to use the fittings pictured in Figure No. 2. These fittings will line up with the service being renewed, in addition giving the effect of a swing joint.

To renew ¾" and 1" services, after replacing the connection at the main, the fittings on the basement end of the service are removed and the foundation wall is cut loose from around the pipe. The "Driving Point" is then slipped over the end of the old service pipe and a length of new 1¼" pipe is screwed into the coupling on the other end of the "Driving Point." The "Driving Head" is then inserted into the free end of the new 1¼" pipe and the opposite end of the "Driving Head" placed in a pneumatic paving breaker. By operating the pacing breaker the new pipe is driven out pushing the old pipe ahead. As the old pipe emerges into the excavation, it is bent up with a looped chain and a steel bar used as a lever, and broken or cut off. When the new pipe reaches the excavation, the "Driving Point" is removed and the new 1¼" pipe is entered into the new fittings and tightened by turning the pipe in the basement with a wrench. The same procedure is followed to renew 1¼" services with new 1¼" pipe, ex-

* *Paper read at Penna. Gas Assn. meeting, at Skytop, Pa., May 7-8-9.*

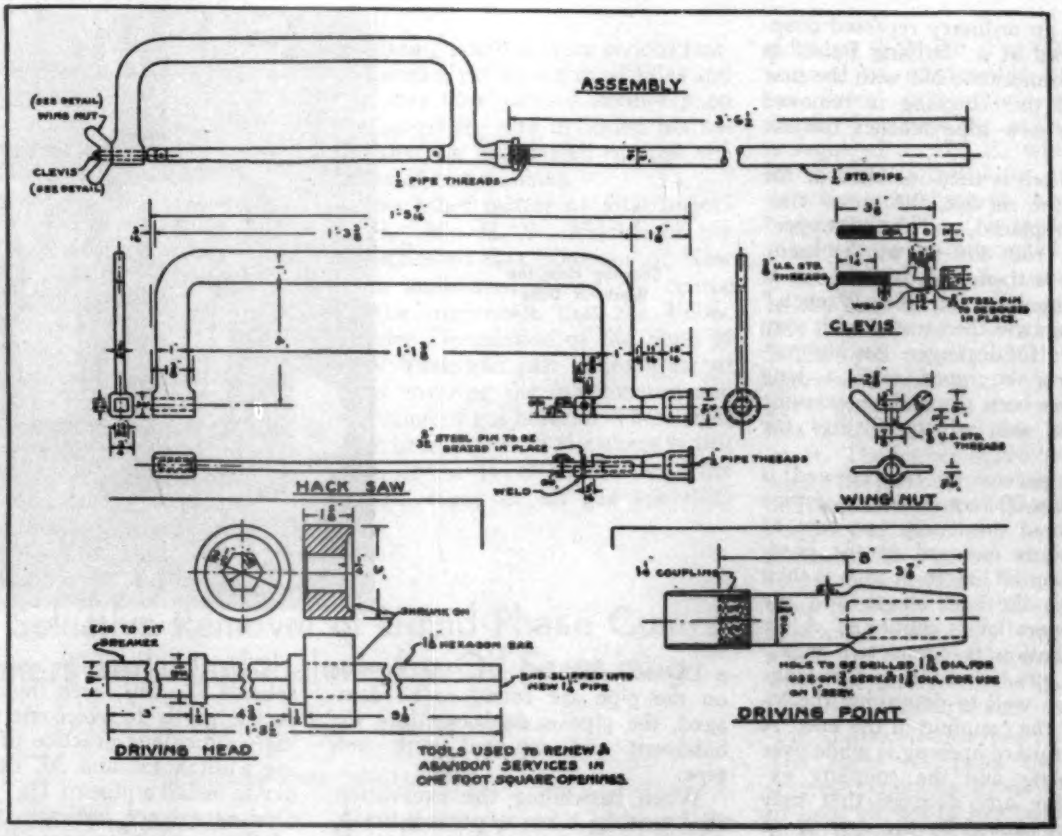

ASSEMBLY
CLEVIS
CLEVIS
WING NUT
HACK SAW
DRIVING HEAD
DRIVING POINT
TOOLS USED TO RENEW & ABANDON SERVICES IN ONE FOOT SQUARE OPENINGS.

Fig. 3

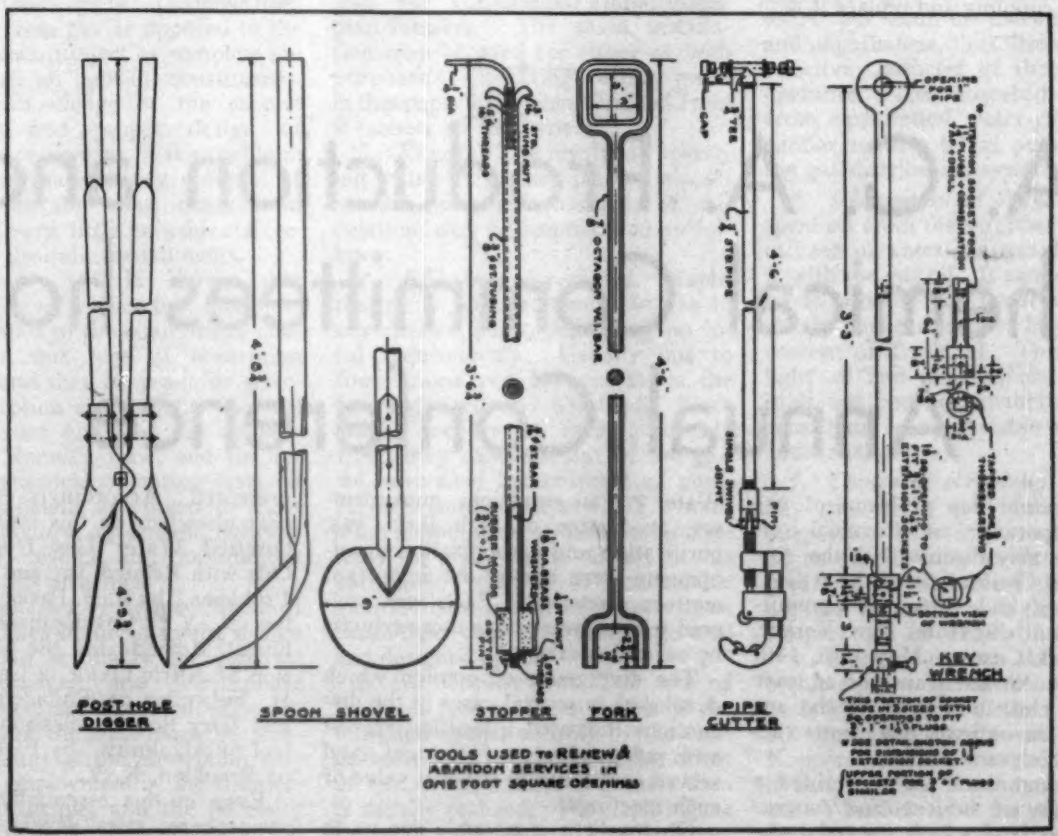

POST HOLE DIGGER
SPOON SHOVEL
STOPPER
FORK
PIPE CUTTER
KEY WRENCH
TOOLS USED TO RENEW & ABANDON SERVICES IN ONE FOOT SQUARE OPENINGS

Fig. 4

cept that an ordinary recessed coupling instead of a "Driving Point" is used to connect the old with the new pipe, and this coupling is removed when the new pipe reaches the excavation.

A new tee is then installed at the head of the service, the meter connections replaced, and the "Stopper" removed from the tee at the main. The plug is then placed in the tee at the main by using the "Key Wrench." The fittings are then tested with soap and water for leakage. An automobile mirror equipped with a long handle has been devised to examine the under side of the fittings for leaks.

If the service to be renewed is longer than 20 feet, a length of pipe is driven out until only one foot of pipe remains exposed in the basement. A second length of pipe is then coupled to the first length and the driving operation is continued. After the installation is completed, measurements are taken from the front foundation wall to determine the location of the coupling in the line. A one-foot square opening is made over the coupling and the coupling examined for any damage that may have been caused by the driving of the pipe. If the coupling on the pipe is found to be damaged, the opening is enlarged sufficiently to remove the damaged coupling and replace it with a Dresser coupling. If the threads on the pipe are found to be damaged, the pipe is re-drawn into the basement and replaced with new pipe.

Showing How the Work Is Done

When backfilling the excavation, care must be taken to prevent breakage of the fittings at the main. At least one foot of earth should be placed over the fittings for a cushion effect before tamping.

Objections may be raised to a scheme like this, even though its effect is partly to overcome the seemingly ridiculous practice of excavating a ditch 15" and 30" deep in order to install a pipe of 1¼" diameter. Our experience indicates that most of these objections are invalid, and will automatically remove themselves if intelligent effort is applied to the work.

A. G. A. Production and Chemical Committees hold Annual Conference

THE present day problems of gas plant operation and chemical control were ably discussed at the Annual Joint Conference of the A.G.A. Production and Chemical Committees held at the Hotel New Yorker, New York City, on May 13th, 14th and 15th. An attendance of at least 400 is a clear indication of the importance the industry has come to attach to this event.

The committees wisely avoided a multiplicity of subjects and concentrated on those which seemed to be of outstanding present importance. Water gas tar emulsions, gum formers, production of high B.t.u. gas, purification and carbonization developments were among the important matters discussed. Each was covered with commendable thoroughness by several speakers.

The divergence of opinion which developed in several cases in the discussions indicated a healthy interest and independence of thought, and served to emphasize the real value of such meetings.

Obviously it is possible for us to publish only a few of the papers presented. Accordingly there appear elsewhere in this issue: "Carburetted Water Gas from Heavy Oils with Related Tar and Emulsion Problems," by F. B. Parke of Brooklyn, N. Y.; "Development of Analytical Methods for the Determination of Nitric Oxide in Gas," by W. H. Fulweiler of Philadelphia, Pa.; and "Dry Box Purification and Control of Alkalinity," by E. J. Murphy of Brooklyn, N. Y.

Even in this essentially technical atmosphere, sales development and its present day importance to the gas

industry came in for due consideration. In a presentation at the beginning of the conference, Mr. Walter C. Beckjord, Vice-President of the Columbia Gas & Electric Company, told of the competitive and general economic situation and explained why concerted sales effort is so vital to the future success of our business. Technical men he felt, have a real place in such work, not only in direct sales engineering but also in the development of new equipment and processes in which gas is used.

Mr. Alexander Forward, Managing Director of the American Gas Association, greeted those attending the conference and stated that although governmental activities and increasing taxation were serious matters ahead, yet the curve of sales and revenues now seemed definitely on the up-grade. He indicated his belief that we had passed through the worst of our troubles.

One other matter of vital importance. Mr. H. W. Aldrich of the Consolidated Gas Company of New York announced during the course of the conference that the Public Service Commission of the State of New York had just issued a set of rules covering the maintenance and operation of gas holders. These rules have been reprinted elsewhere in this issue of the JOURNAL and merit the careful study of all gas operating men.

The Selective Removal of Liquid-Phase Gum-Formers and Naphthalene by Oil Scrubbing

ALFRED R. POWELL, *Chief Chemical Engineer*

SUMMARY AND CONCLUSIONS

1. *Purpose.* This paper describes the theories, principles and practice of selective absorption of such compounds as naphthalene and liquid-phase gum-formers (indene and styrene) from gas as opposed to the better-known subject of complete absorption of all light-oil constituents. With a knowledge of the correct principles and proper design of scrubbing equipment, it is possible to secure very satisfactory removal of these undesirable constituents from gas with very little coincidental removal of desirable constituents.

2. *Theory.* It is shown that Raoult's Law, with a few modifications, applies to the equilibrium conditions in this type of absorption process, and may be used for selective-absorption calculations. Several examples are given of the applications of Raoult's Law, and the results of practical operating tests on plant equipment are given to show the satisfactory agreement between operating results and calculations based on this principle.

3. *Principles of design.* Some of the principles involved in the design of selective scrubbers for removal of naphthalene and liquid-phase gum-formers are discussed. The importance of the avoidance of stagnant oil films at the absorption surface, the employment of the counter-current principle, and the necessity of long time of contact between oil and gas are emphasized.

4. *Koppers type selective scrubber.* A brief description is given of the Koppers equipment for selective absorption. This has been widely used for absorption of naphthalene and also for removal of liquid-phase gum-formers. The same installation may be used for either or both purposes. Operating results given in this paper have been obtained from scrubbers of this type.

5. *Results.* The results of operating tests at various plants, supplemented by proven methods of calculation, may be summarized as follows:

a. Efficiency of removal. Naphthalene is removed from the gas to any desired point, depending on local requirements. Usually one to four grains per 100 cu. ft. is the figure desired and obtained. Since indene and styrene form gum only when they condense out of the gas, we have used the criterion of gum-formers condensible at 32° F. (minimum temperature of distribution system) for many years. Based on this yard-stick, removal of condensible gum-formers has always been more than 90 per cent in correctly operated and designed plants.

b. Oil Requirement. The rate of fresh-oil feed to the scrubber is determined almost entirely by the temperature of scrubbing, and this effect of temperature is much greater than is usually realized. For naphthalene removal, only about 12 gallons per million cu. ft. is required at 57° F., while ten times this amount is required at 100° F. For 90 per cent removal of condensible gum-formers from carburetted water-gas, about 60 gallons per million cu. ft. is required at 57° F., while almost 500 gallons is called for at 100° F. Selective scrubbing at temperatures higher than 100° F. is inefficient and should never be attempted.

c. Loss in heating value of gas. In the case of naphthalene removal, this amounts to approximately one B.T.U. per cu. ft., which is an inappreciable amount. Where liquid-phase gum-formers are removed, the loss is from two to nine B.T.U. per cu. ft. The higher figure obtains only where the gas contains large amounts of condensible gum-formers, and the majority of this loss in heating value is due to the removal of these gum-formers themselves. However, even these relatively small losses are only apparent, since they represent removal of condensible material that would be lost from the gas later in the distribution system.

d. Light oil absorbed by wash oil. The spent oil from the selective scrubber contains 10 to 40 per cent of light oil, which has been absorbed from the gas. The higher percentages of light oil are found at the lower scrubbing temperatures. This absorbed light oil contains from 30 to 70 per cent of indene, styrene, and naphthalene, thus illustrating the selective character of the scrubbing operation. The absorbed light oil from carburetted water-gas is quite similar to drip oil as pumped from the gas-distribution system.

e. Disposition of spent oil. The spent oil from the scrubber is usually utilized in water-gas sets, by mixing it with the gas oil. It can be counted on to produce the usual amount of gas in the carburetor, based on its content of fresh oil. The absorbed light oil and naphthalene contained in it are poor gas-makers and will contribute no appreciable amount of additional gas.

f. Choice of scrubbing oil. Usually gas oil is used for scrubbing purposes. It is important that the oil be free-flowing at scrubber temperature, and it is very desirable to use an oil with a high first-drop temperature on distillation test.

g. Operating costs. Allowing full credit for the spent oil on an equal basis with the cost of the fresh wash oil, the total cost of operation of the Koppers selective scrubber is exceptionally low for a gas treating process. Whether used for naphthalene removal or removal of condensible gum-formers, this cost is less than 0.03 cent per M. cu. ft. of gas.

Effect of Oil Fogging on Naphthalene and Gum Deposits

Technical Department
Standard Oil Company (Indiana)
Chicago, Illinois

Summary

1. This work covers a study of the use of fogging oil in manufactured gas systems, particularly with reference to naphthalene deposits and gum formation.

2. In order to prevent gum formation, the use of a fogging oil containing an inhibitor is proposed. It is shown that in an experimental setup an oil containing an inhibitor markedly decreased gum formation in the presence of nitric oxide.

3. It is apparent from results at one plant where sufficient oil was fogged that the presence of the fogging oil markedly reduced the number of naphthalene complaints compared with a period of no fogging. At the other plant, a reduction was obtained when fogging was originally started but the extent of the reduction is not so great as for the previously mentioned plant because of insufficient oil in the system. It is obvious that this effect of the fogging oil is obtained whether or not an inhibitor is used.

4. Determinations of the amount of gum in the gas at one plant studied, comparing periods of inhibitor application with periods of no inhibitor, show reduction in the amount of gum in the presence of the inhibitor. Due to application of the oil plus inhibitor after the gas had passed through the holder, except in one test, preformed gum was already present, and the inhibitor was effective to the extent of preventing subsequent gum formation. Data are less positive for the other plant studied due to differences in method of gas distribution affecting the amount of inhibitor in the system.

5. Application of fogging oil containing an inhibitor to the gas entering the holder shows a more effective control of gum at test stations and a practical elimination of gum polymerization following holder storage. Preformed gum is noted in the gas at the holder inlet at both plants. At one plant it is known that the high-line gas used for blending contains polymerized gum. At the other plant polymerization to gum has apparently partially occurred before delivery to the holder.

6. Without the use of the inhibitor it was found that an initial decrease (dropout) of preformed gum occurs in the distribution lines followed by an increase in gum content due to subsequent gum formation. During inhibitor application, the dropout of preformed gum is not followed by an increase, indicating the controlling value of an inhibitor properly applied.

7. At one plant some correlation of data on pilot outages and gum is found, an increase in gum resulting in a subsequent but not proportional increase in the average daily outages. At the other plant no good agreement is found because of complicating factors, principally dust in the gas. During the period of best gum control at the latter plant, the dust problem was at its peak resulting in high outage complaints. Remedial measures for dust elimination are now under way and should produce reduction in complaints from that source.

8. Quantitative data are presented showing effect of storage and subsequent compression on gum content and indicate desirability of inhibitor application as early as possible in the movement of the gas from the point of manufacture to the consumers' appliances.

Conclusion

Application of a fogging oil containing an inhibitor for gum formation at the proper points in a distribution system and in sufficient quantities offers a means for control of naphthalene stoppages and gum formation.

Fogging oils were originally introduced for the purpose of controlling gas leakage and corrosion of mains with attendant transportation of dust deposits. Their original application was restricted almost entirely to systems distributing natural gas or to old manufactured gas systems which had changed over to natural gas or blends of natural and manufactured. It is unnecessary to review here the details involving the effect of the drying out of diaphragms, valve packing, and gasketing, except to state that oil fogging replaces in function the former moist condition.

The work to be discussed involving the application of a fogging oil containing an inhibitor to mixed gas or coal gas systems shows significant effects on naphthalene deposits and gum formation.

The causes of formation of gum deposits are pretty well understood today as the result of many investigations in the field both in foreign countries and here, among which the work of Shively (1) and of Fulweiler (2) are best known. To summarize very briefly, it was shown that certain reactive unsaturated hydrocarbons mainly indene and styrene, were mother substances or gum formers. They were produced in the course of decomposition of coal or the cracking of gas oil and readily polymerized through oxidation to form gums. The oxidation process proceeded in two distinct ways under the influence of catalysts also naturally present in the gas, to form in one case liquid phase gum and in the other vapor phase gum. Liquid phase gum resulted from oxidation and subsequent polymerization of the gum formers after they had condensed out in the system.

Vapor phase gum, on the other hand, was produced as particles in the gas from the same gum formers as a result of the action of nitric oxide, both as an oxygen carrier and by direct chemical union. Both types of gum are frequently found in the same system and both are a distinct nuisance, liquid phase gum due to its clogging ability and hardening effect on diaphragms and vapor phase gum due primarily to its collecting on pilot needles producing outages.

At this point the similarity of gum formation in gas distribution systems and in gasoline was realized, the same gum formers being present. In gasoline they resulted, of course, from the cracking operation to produce high antiknock value fuels.

to say nothing of $500.00

On May 15, 1935 we inspected one of our U. S. Giant Coke Conveyor Belts in operation in the Pittsburgh District and found that it had carried approximately 1,500,000 tons of coke.

This belt replaced another make which, after a total tonnage of 1,291,000, had to be taken out and repaired at a cost of $500.00.

This U. S. Giant Coke Belt underwent NO REPAIRS. NONE WERE NEEDED, in spite of the great tonnage. Today this belt is operating as usual, and should carry a great many more tons.

Installation highlights are as follows: U. S. Giant Coke Conveyor Belt, 36", 6-ply, 3/16" top, 3/64" pulley cover. Speed—212 ft. per minute, Koppers speed reducer. Motor—20 H.P., 875 R.P.M. Head pulley—30" x 44". Tail pulley—24" x 38".

Although this belt outlasted and outperformed the competitive belt which it replaced, its record (still in the making) but reflects the superior quality of any belt sold under the U. S. Trade Mark. For particulars write our nearest branch.

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US
TRADE MARK

United States Rubber Company

The "MANUFACTURE" *of Coal . . . .*

PREPARATION, the usual term applied to the sizing and cleaning of coal is an inadequate description of the processes through which BOONE CHILTON gas Coals are carried in their adaptation to Oven, Retort and Water Gas production. The tipples of the Boone County Coal Corporation are, in fact, *modern manufacturing plants.*

RECENT extensions to the company's mechanical cleaning equipment now insure the same dependable uniformity of quality in Run-of-Mine and Nut-and-Slack sizes that has always characterized Processed BOONE-CHILTON Lump and other prepared grades.

A TEST of BOONE-CHILTON *mechanically cleaned* coal will establish an accurate standard of results and values for all subsequent shipments.

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Development of Analytical Methods for the Determination of Nitric Oxide in Gas

By

W. H. Fulweiler

The United Gas Improvement Co., Philadelphia, Pa.

Concentration of Nitric Oxide in City Gas

THE very low concentrations in which nitric oxide usually occurs in the gas renders the determination somewhat more difficult than that of the other impurities with which the gas industry is familiar. The following table indicates the range in concentrations that we may expect to encounter expressed in several ways.

TABLE I.—CONCENTRATION OF NO EXPRESSED IN DIFFERENT UNITS

	Parts per Million	Grams per Million	Grains per 100 cu. ft.	Milligrams per cu. ft.	% by Vol.
Probable Maximum	10	.354	0.54	0.354	0.001
Average Concentration	0.028	1.0	0.00154	0.001	0.000003
Desirable Limit of Method	0.003	0.1	0.00015	0.0001	0.0000003

In spite of the hybrid character of the expression "grams per million" it is very convenient for practical use as the results are usually integers and not small decimals, as is the case with the usual "grains per 100 cu. ft."

It is evident from these data that the ordinary volumetric or gravimetric methods would not be applicable and that colorimetric methods would probably offer the greater promise of reaching the desired precision.

Survey of Possible Methods for Determination

The literature was reviewed and the suggested methods were carefully considered in view of the limitations imposed by the low concentrations involved; the chemical characteristics of the compounds present in city gas and the purity of the reagents available. Out of a large number of different methods and variations that were found, some 50 or more were actually tried. These may be classified as follows:

1. Physical methods, spectral absorption, etc.
2. Direct absorption as NO
3. Catalytic conversion to ammonia
4. Oxidation to NO_2
   (a) By passage over or through a liquid oxidizing agent such as chromic acid, hydrogen peroxide, etc.

   The NO_2 is absorbed either in an alkali or to form a dye and is determined colorimetrically.

   I —as nitrite

   II —after further oxidation as a nitrate

   III—after reduction as ammonia.

Physical Methods

Due to the low concentration the physical methods that appeared to give the greatest promise were those involving spectral absorption.

Very little data were available on absorption spectra in the ultra violet and the preliminary experiments that were made were not at all promising.

A considerable amount of work has been done on absorption in the infra red. This appeared to be more promising but investigation indicated that to secure a precision of 1 gram per million would have required a very long gas cell under rather high pressure and the expensive type of apparatus required rendered this method too cumbersome and delicate for this work.

A considerable time was spent in the development of apparatus for the Allison magneto-optic method. The results have not been very encouraging, apparently due to the complexity of the electric circuits involved.

Our investigation indicated, therefore, that there was very little hope of success with purely physical methods.

Direct Absorption as NO

Due to the inert character of NO it is quite difficult to secure complete absorption, especially at low concentrations. There are, of course, several methods that are used for the analyses of mixtures containing relatively high concentrations of NO but these were not applicable to the low concentrations under consideration.

Only two materials appeared to give any promise for the quantitative absorption of NO as such. These are the sulphides, particularly those of the iron group and barium peroxide.

We have been able to secure complete absorption with even small quantities of NO, with iron sulphides, but we have had difficulty in recovering the NO from the complex thus formed. In our experiments, the NO was recovered as ammonia.

Barium peroxide, while it will apparently absorb the NO satisfactorily does not appear to be practical with the present purity of the reagent that is available.

Catalytic Conversion to Ammonia

While the literature indicated that the platinum metals as such resulted in considerable decomposition of NO into nitrogen, both platinum black and palladium black appeared to give practically quantitative conversion into ammonia in the presence of hydrogen. Our experiments indicated that in mixtures of inert gas such as nitrogen and hydrogen, quite satisfactory conversion to ammonia

was obtained but with city gas the catalyst was poisoned so rapidly that the yields are quite unsatisfactory. A number of other catalysts which were reported to be immune from poison were tried. Among these were ammonium sulphide and tungsten sulphide which were proposed by Tropsch and Kessler[2]. Our experimental results were quite low and irregular and were not very promising.

Oxidation Methods

By far the greater number of methods in the literature involved the oxidation of the NO to NO_2 which is very much more reactive and can be readily absorbed and for the determinations of which there are a number of colorimetric methods available of high sensitivity. A summary of our work with these methods is given in Table 2.

TABLE 2.

Author	Type	Oxidizing Agent	Absorbent	Determined as	Method	Reagent
Terres[3]	Dynamic	Air	KOH	NH_3	Titration	H_2SO_4
	Not adopted to low concentration.					
Allison et al[4]	Static	Alk. H_2O_2	Same	Nitrate	Color	(A)
	Incomplete recovery—high blank.					
Frances & Parsons[5]	Static	Acid H_2O_2	Same	Nitrate	Color	(A)
	Better recovery—high blank.					
Shuftan[6]	Dynamic	O_3	Reagent	Nitrite	Color	(B)
	Reagent unstable—correction factors erroneous.					
Picard et al[7]	Static	Acid H_2O_2	Same	Nitrate	Color	(A)
	Low recovery for our conditions—blank reduced.					
Tropsch & Kassler[8]	Static	O_3	KOH	Nitrite	Color	(C)
	Low recovery—time consuming.					
Wood[9]	Dynamic	Chromic Acid	Same	NH_3	Color	(D)
	Chromic acid mixtures reacts with olefines—low sensitivity.					
Pieters[10]	Dynamic	O_3	Reagent	Nitrite	Color	(B)
	Repeats Shuftan's error re correction factor.					
Shuftan[11]	Dynamic	O_3	Reagent	Nitrite	Color	(B)
	More detailed study of each method—same errors.					
Traumm & Grimm[12]	Static	O_3	KOH	Nitrite	Color	(C)
	Requires three days—too long.					
Guyer & Weber[13]	Dynamic	Acid Permanganate	Reagent	Nitrite	Color	(C)
	Permanganate reacts with olefines giving variable recovery.					
Seebaum & Hartmann[14]	Dynamic	Acid Permanganate	Reagent	Nitrite	Color	(C)
	Attempt to improve Guyer method.					

(A) Phenol disulfonic acid.
(B) Meta-phenylene diamine.
(C) Sulfanilic acid and α naphthylamine = Griess or Lunge — Ilosvay.
(D) Nessler's Reagent.

This table indicates briefly the outline of the method and the difficulties that we found with it. It should be remembered that these methods were intended for use with NO concentrations of from ten to one hundred times those used in our tests.

Oxidizing Agent

There are two general methods of oxidizing the NO; the use of a high partial pressure of oxygen in the gas phase, or the use of liquid oxidizing mixtures such as chromic acid, potassium permanganate or hydrogen peroxide.

The early work with the static methods was with acid or alkaline peroxide of hydrogen. This appeared to be fairly satisfactory as an oxidizing agent if the proper conditions were used and if proper absorption could be secured. It was time-consuming but the fundamental difficulty was the inability to secure hydrogen peroxide of sufficient purity that would not give too large a blank.

The use of chromic acid and acid potassium permanganate both suffered from the very serious disadvantage that they reacted with the unsaturated hydrocarbons and possibly other components of the gas so that the efficiency of oxidation varied quite rapidly, depending upon the composition and amount of gas passed. It appeared, therefore, that the use of oxygen in the gas phase which in spite of the theoretical slow rate of reaction give the greatest promise of success.

We were constantly impressed with the desirability of being able to use larger samples in order to get over the lack of sensitivity of the colorimetric methods available, and this pointed naturally to the use of dynamic methods.

Sensitivity of Reagents

The necessity of a highly sensitive method for the determination as nitrite, nitrate or ammonia led us into a study of the sensitivity of the available methods.

This subject has been rather completely studied in connection with the analysis of water. This work indicated the following order of sensitivity.

In addition to the usual reagents we tried a number that were suggested in the literature but were unable to find any reagent that was more satisfactory or of greater sensitivity than the Griess-Ilosvay.

We therefore adopted the Griess-Ilosvay reagent as a standard and concentrated our efforts on determining the best conditions for its use and the possibility of interference due to components which might be present in our city gas.

Effect of Reaction Time

One of the first points to be given consideration was the appropriate reaction time to be allowed for the oxidation to take place. The literature led us to believe that we could not expect a very high recovery even with a large partial pressure of oxygen. Shuftan's work had apparently confirmed this and he proposed using a time of contact of 15 minutes. Our own work with mixtures of NO and nitrogen or hydrogen also indicated a very low recovery. With city gas, however, an entirely different picture was presented. We found that the recovery increased very rapidly from a negligible time of contact up to a maximum at between 1.5 and 2 minutes, and then decreased somewhat more slowly. This indicated the probability that there was present some compound in the city gas which catalyzed the NO-NO_2 reaction. These data are shown in Figure 1.

These data indicated that Shuftan, as well as the other foreign chemists, had apparently been unaware of this catalytic activity and had based his correction factors (which were much too large) on the results obtained with nitrogen.

We made a careful study of the effect of various reagents and methods of treatment with different types of gases on the percentage recovery when known amounts of NO were added.

Essentially, these experiments indicated that by passing the gas through cooling mixtures the recovery obtained from city gas could be increased up to a maximum which then decreased to a very low figure as the temperature was progressively lowered. At the temperature of liquid air, we obtained the same recovery as with nitrogen. The activity of city gas could likewise be destroyed by passing it through bromine

TABLE 3—SENSITIVITY OF REAGENTS FOR DETERMINATION OF NITRATES, NITRITES AND AMMONIA

Griess-Ilosvay	nitrite	— 0.0001	milligrams NO
Reduced Strychnine	nitrate	— 0.0002	milligrams NO
Phenyl disulfonic acid	nitrate	— 0.002	milligrams NO
Meta phenylene diamine	nitrite	— 0.002	milligrams NO
Nessler	ammonia	— 0.002	milligrams NO

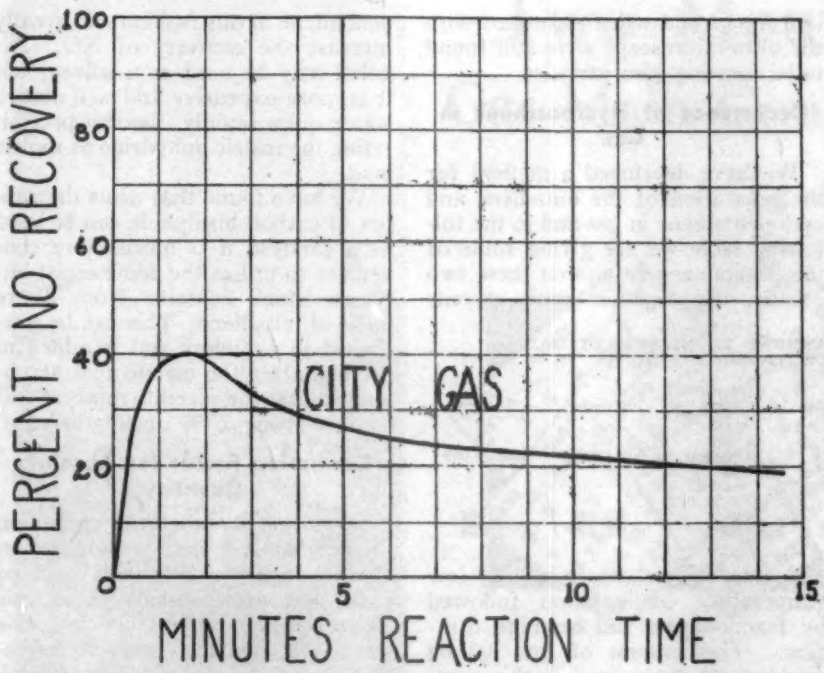

Fig. 1

or concentrated sulphuric acid. This indicated, as did the original curve, that there were undoubtedly two reactions going on. In one, the oxidation of NO to NO_2 was catalyzed by one set of components while on the other hand either there was present a negative catalyst which had a considerable induction period or there was present another set of compounds which reacted with the NO_2 after it was formed to thus remove it from the sphere of the reaction.

The various fractions obtained by condensing the gas to low temperatures were examined and it was found that the most active fraction was that boiling between 79° and 80° C.

A great many of the hydrocarbons likely to be present in the gas were prepared and examined. The paraffins seem to be without effect. Ethylene and propylene were also without effect, but commercial butylene was quite active.

The three butylenes probably present in commercial butylene were then prepared synthetically and were found to be without catalytic activity. This led to a careful study of the commercial butylene used and it was eventually found to contain from 25 to 30% of butadiene, which was found to be quite effective as a catalyst. When the butadiene was removed from the commercial butylene its catalytic activity was destroyed. A number of the dienes exist in appreciable quantities in the gas when prepared. It was found that those containing conjugated double bonds were all active catalysts while the others were not effective. This observation also explained the activity of the 79° to 80°C. fraction as being due to hexadiene. It was found that city gas contained an appreciable amount of butadiene and that when this was removed the recovery dropped to a very low figure.

In the course of this work it was found that there were several unrelated substances that also possessed catalytic activity for this reaction. Carbon bisulphide, unpurified phosphene and acetylene were all excellent catalysts. We have no explanation as to why these materials should act as catalysts. For a long time, it was believed that the activity of carbon bisulphide was due to some impurity. A great deal of time was spent attempting to purify it and to prepare it by various synthetic methods. All of the samples showed activity. On the other hand, both acetylene and phosphene when scrubbed with alkali lose their catalytic activity and when the acetylene was prepared by the reaction of bromoform, zinc dust and cupric chloride solution it was practically inactive.

It is interesting to note that carbon bisulphide in the concentration in which it normally exists in city gas, say below .1% by volume, does not show any catalytic activity. The maximum recovery was obtained when the concentration was in the neighborhood of .9% by volume, so that while it may contribute slightly it is not an important catalyst.

It is our belief that the catalytic activity of city gas is due to the presence of dienes and of these butadiene is by far the most important.

Hydrocarbons Reacting With NO_2

The second important reaction, that accounting for the rapid drop in recovery with increase in reaction time was not so difficult to handle due to the large amount of data that we had accumulated in our search for the catalyst. The experimental work consisted in determining the rate at which various hydrocarbons would react with known amounts of pure NO_2 and the results could be expressed by the percentage of recovery secured after the reaction had taken place in our test apparatus. The usual paraffins and olefines were found to react rather slowly, giving figures showing a reduction of only a few per cent in the recovery after a 15 minute time of contact.

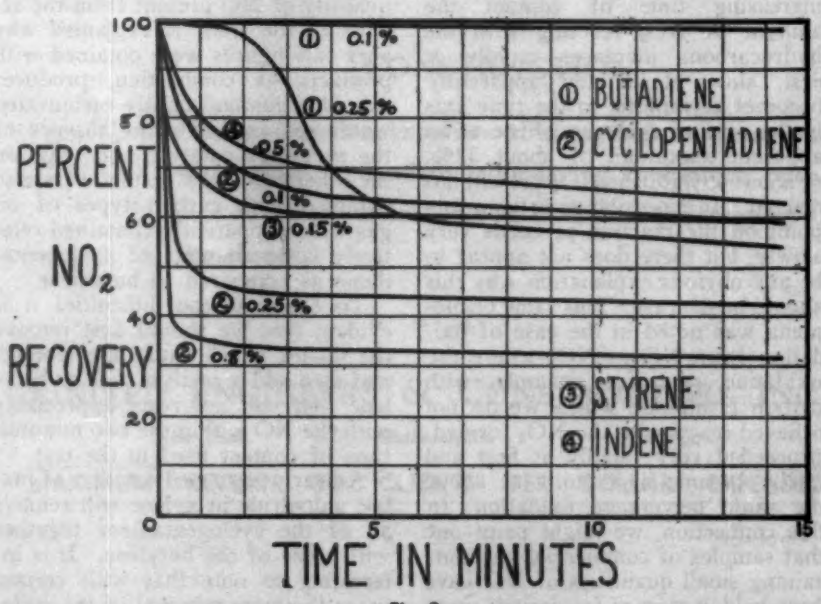

Fig. 2

The hydrocarbons that have usually been considered as gum forming hydrocarbons, however, all reacted with NO_2 quite rapidly and the results obtained are summarized in Figure 2.

This figure indicates the rate at which the different concentrations of the hydrocarbons reacted. The time scale is in minutes and the abscissa is the percentage recovered after different periods of reaction as determined with the spot test. Butylene exhibits the peculiar result that within 15 minutes at a concentration of .1% by volume no reaction was detected and with a concentration of .25% there is apparently an induction period so that with a time of contact of 2 minutes there is very little reaction. This is a partial explanation of the results previously discussed where with a time of contact of 1.5 to 2 minutes we obtained the maximum recovery and is a justification for the choice of this time of reaction in our test. The other hydrocarbons do not show this induction period. Cyclopentadiene is obviously the most rapid reactant and together with butadiene clearly explains the rapid drop in the amount of NO recovered as the reaction time is increased. The styrene and indene also react rather vigorously.

It is interesting to note that with increasing time of contact the amount of NO_2 reacting with the hydrocarbons increases rapidly at first, slows down and apparently becomes asymptotic to the time axis in the case of cyclopentadiene at an apparent maximum of about 32%, or about 68% of the NO_2 present has reacted. It is possible that from this point on the reaction proceeds very slowly, but there does not appear to be any obvious explanation why this should be the case. This same phenomena was noted in the case of oxidation from NO to NO_2 where the oxidation rate, for example, with carbon bisulphide which we do not believed reacts with the NO_2 formed, proceeded very rapidly at first and finally became asymptotic at about the same percentage oxidation. In this connection, we might point out that samples of commercial gas containing small quantities of NO have been held in storage for periods up to two weeks and when examined with the ultra-microscope were still found to be forming gum particles.

TABLE 4—GUM FORMING HYDROCARBONS IN DIFFERENT GASES
CONCENTRATION IN PERCENTAGE BY VOLUME

Type of Gas	Butadiene	Cyclopentadiene	Styrene	Indene
Producer Gas	nil	nil	nil	nil
Blue Water Gas	nil	nil	nil	nil
Coke Oven Gas	0.1-0.15	0.05-0.10	0.004-0.009	0.004-0.009
Horizontal Coal Gas	0.2-0.25	.02		
C. W. G., 375 B.t.u.	0.01	nil		
C. W. G., 400 B.t.u.	0.3	0.2		
C. W. G., 535 B.t.u.	0.8	0.7	.02-.08	.02-.08
Oil Gas	0.05	0.02	.02-.08	.02-.08

Occurrence of Hydrocarbons in Gas

We have developed a method for the separation of the butadiene and cyclopentadiene in gas and in the following table we are giving some of the preliminary results on these two constituents together with styrene and indene were determined by low temperature condensation followed by fractionation and bromine titration. The amount of low boiling unsaturants determined in this manner is of the same order of magnitude as the figure given for cyclopentadiene, the butadiene due to its low boiling point apparently escapes as the condensate is removed from the condensers.

Application to Test Method

The confirmation of our earlier theory that there were two reactions going on, that is, a catalyst increasing the rate of oxidation of NO to NO_2 which was followed by a rapid reaction of the NO_2 formed with certain hydrocarbons explained many of the curious results which had been obtained in determining the factor to be used in calculating the total quantity of NO present from the results of the tests. It explained why very low figures were obtained with products of combustion, producer gas, blue gas and lightly carburetted water gas as due to the absence of the necessary catalyst, and why, on the other hand, low results were also obtained with certain types of oil gas which apparently contained relatively large amounts of cyclopentadiene as compared to butadiene.

To eliminate the difficulties it is evident that we should first remove the dienes which cause the trouble, and then add a catalyst such as butylene that will not react appreciably with the NO within the two minutes' time of contact used in the test.

A nearly saturated solution of maleic anhydride in xylene will remove all of the cyclopentadiene together with some of the butylene. It is interesting to note that with certain gases the mere removal of the cyclopentadiene in this fashion will greatly increase the recovery of NO. Alcohol may be used as a solvent but it is more expensive and will absorb water quite rapidly, thereby precipitating the maleic anhydride as moleic acid.

We have found that while the vapors of carbon bisulphide can be used as a catalyst, it is much more convenient to utilize the commercial butylene which contains from 25 to 30% of butadiene. This can be purchased in cylinders and is added to the gas after the maleic acid scrubbing so that the reaction mixture will contain about .25% of butadiene.

Correction Factor for Absolute Quantity

In our earlier work the correction factor that we used was based on about one dozen different types of gases that were available in or near Philadelphia, and at the time this work was done the observed correction factors did not vary a great deal, the recovery varying from 33% to 40% or giving a correction factor of about 2.5 to 3. As we extended our work, however, it was found that while the coke oven gases did not vary a great deal from these figures, samples of lightly carburetted water gas, certain samples of oil gas and some carburetted water gas showed a considerable variation so that it was necessary, for accurate work, to determine the recovery on the type of gas under test. The present modification of the test in which the dienes are removed, followed by the addition of a catalyst, seems to be practically independent of the type of gas being tested and the recovery varies only a few per cent from 60% thus giving a factor of 1.67. It would appear that the additional complication involved is more than compensated for by the wider application of the test and a much smaller and constant correction factor.

Details of the Present Test

It has been necessary, in the course of the work, to study a great many of the factors which might or might not affect the accuracy of the determination. It is found, for example, that it is necessary to remove hydrogen sulphide. Small quantities of ammonia seem to be without effect but it is desirable to scrub the crude coal gas with a dilute sulphuric acid solution in order to eliminate large quantities.

In order to prevent the formation of nitric acid, it seems desirable to render the gas as dry as possible, so that the caustic potash solution which

(Continued on page 59)

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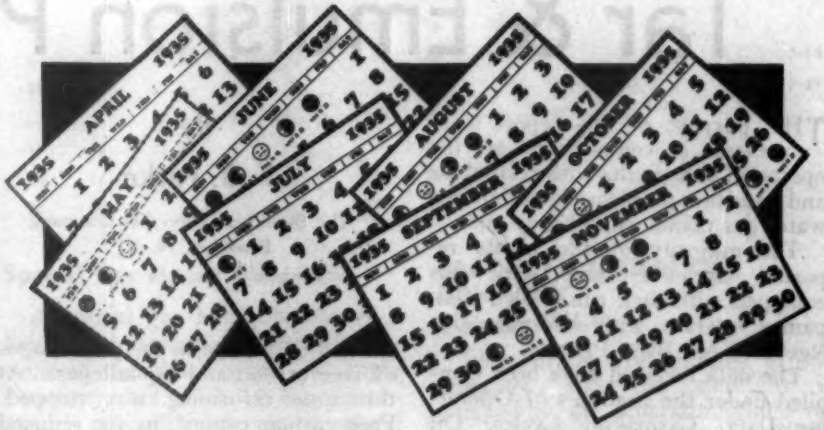

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Carburetted Water Gas From Heavy Oils With Related Tar & Emulsion Problems

By

F. B. Parke

The Brooklyn Union Gas Company
Brooklyn, N. Y.

THE purpose of this report is to present a comparison of the operation and results with related tar and emulsion problems in carbureted water gas plants using heavy oils.

The majority of the plants reported on have three shell sets equipped with back run. Two companies operate with Western Gas Reversed Air Blast Process.

The data received have been compiled under the headings of Operating Data, Gasmaking Cycles, Oil Analyses, Tar and Emulsion Analyses, and Dehydration Equipment.

Table No. 1 gives the analyses of the various oils used.

Residuum Oil

At the Citizens Works we found it was necessary to clean carburetors and wash boxes weekly, either when reforming or non-reforming. For a long period of time 30 gallons of oil was reformed and no dehydration difficulties were experienced. Most of the dehydration is accomplished in treatment tanks. Due probably to some change in oil received, the treatment tanks became less effective and a large amount of dehydration had to be accomplished in the stills. When this occurred, the tar analysis showed no change in the percentages of free carbon and asphaltenes. At this time reforming was stopped. Free carbon content in tar reduced to half and asphaltenes content remained the same, and the emulsion was very easily broken up in the treatment tanks.

The Brooklyn Borough Plant and the Newport Gas Light Company Plant, having Western Gas Reversed Air Blast process, use this oil also. All oil is introduced into the top of generator, resulting in less deposits in the checkered carburetter. Difficulties were experienced in dehydration only when greater amounts of reforming oil were used.

Heavy Enrichment Oil

Citizens Works has been operating with heavy enrichment oil, non-reforming since March 1, 1935. Due to increased carbon deposits, it has been necessary to clean carburetters every three days; the wash box condition remained the same as with residuum oil. The emulsion was more viscous, but no difficulty was experienced in dehydration while no oil was preformed.

Still Bottoms

The Consolidated Gas Company, using Still Bottoms at Hunts Point Plant and C. & D. Houses at Astoria, reports;

"The free carbon in the emulsion (or tar) increases with the amount of reforming and to the extent that the free carbon acts as a stabilizer, the emulsion is rendered more difficult to break down. With some oils the difficulty is hardly noticeable.

"When only 'liquid fuel' tar is necessary to be produced, spraying or pumping through other restricted orifices still further reduces the difficulties.

"But with some oils containing an excess of asphaltenes, processing in the ordinary manner even supplemented by spraying fails to reduce the water content to a workable maximum.

TABLE NO. 1—COMPARISON OF HEAVY OILS USED IN HEAVY OIL OPERATION

COMPANY	Brooklyn Borough Gas Co.	Brooklyn Union Gas Company		Consolidated Gas Company		Newport Gas Light Company	Philadelphia Gas Co.	Public Service Gas Co.	Washington Gas Co.
Kind of Oil & Oil Field	Residuum Gas Oil	Residuum Gas Oil	Heavy Enrichment Oil	C&D Astoria *Bottoms East Texas	Hunts Point **Bottoms East Texas	Standard Oil Co. Residuum Oil	Heavy Fuel Oil	Blend of Topped Texas Crudes	Special Gas House Heavy Oil
Gravity ° A. P. I.	18.3	21.1	18.2	21.2	17.3	22.3	12.6	19.7	16.0
B.t.u. per Gal.									
Calorific Test	148850	147833	150558	.....	.....	.....	.....	149560	148400
Cracking Test	.....	98000	100600	107000	108000	.....	95000	103000	.....
Flash Point, °F.	186	247	338	244	310	.....	235	235	.....
% Sulphur	0.40	1.26	0.84	1.23	0.91	1.39	0.64	0.55	1.40
% Carbon Residue (Conradson)	5.60	5.24	9.40	5.15	8.56	4.96	8.20	4.00	8.5
Viscosity, Saybolt Univ. @ 122° F., sec.	145	230	3856	245	1765	.....	3375	585	.....
Distillation Test									
300-400° F.	0	.05	0	0	0	0	0	0	0
400-500° F.	5.3	4.39	0.7	2.5	0	1.0	1.0	1.1	3.0
500-600° F.	25.7	15.44	5.3	11.0	1.0	13.0	58.0	12.0	7.0
600-700° F.	58.0	42.56	22.3	25.5	4.5	26.5	34.0	71.6	65.0
over 700° F.	11.0	31.18	59.7	61.0	94.5	54.5	7.0	.....	10.0
% Residue	.....	6.38	12.0	.....	.....	5.0	10.0	15.1	15.0
Character of Residue	.....	Coke	Coke	Heavy & Sticky	Heavy & Sticky	.....	.....	Oil Pitch	Solid
Hydrocarbon Series:									
Aromatics	24.5	7.6	13.6	Not. Det.	Not Det.	21.3	12.0	Not Det.	Not Det.
Olefines	29.3	23.8	32.0	.....	.....	19.7	28.0	.....	.....
Naphthenes	39.2	17.5	14.4	.....	.....	27.2	40.0	.....	.....
Paraffins	7.0	51.1	40.1	.....	.....	31.8	20.0	.....	.....

* This oil only used in Carburetters at Astoria.
** This oil used in Generators at Astoria and in both Generator and Carburetter at Hunts Point.

TABLE NO. 2—GAS MAKING CYCLES

PLANT & COMPANY	Avg. Temp. of Sets, ° F.	Gallons Reforming	Tot. Oil per Run, gals.	Oil to Gen., gals.	Oil to Carb., gals.	Steam per M. lbs.	Tot. Cyc., mins.	Blow, sec.	Blow Run, sec.	Up Run, sec.	Time of Enriching Oil Input, s/c.	Back Run, sec.	Time of Reforming Oil Input, sec.	Up Run, sec.	Blast Purge, sec.	Reversed Air Blast & Purge, sec.
Coney Island Plant, Brooklyn Borough Gas Co., Brooklyn, N. Y.	1500	3–4	45	45	0	24.5	3	58	4	59	45	47	3	..	..	8
Citizens Works, Brooklyn Union Gas Co., Brooklyn, N. Y.	1525	0	90	50	40	35.0	5	92	4	101	75	90	0	9	4	..
		30	120	80	40	27.5	5	92	12	93	75	90	40	9	4	..
Astoria "C" House, Astoria Light, Heat & Power Co., Astoria, L. I.	1470	0	75	33	42	....	5¼	102	12	108	75	60	0	15	18	..
Astoria "D" House, Astoria Light, Heat & Power Co., Astoria, L. I.	1420	0	95	50	45	....	5	105	15	90	60	60	0	15	15	..
Hunts Point Plant, Consolidated Gas Co., New York City.	1485	0	100	62	38	30.97	5	93	24	96	36	60	0	15	12	..
Newport Gas Light Co., Newport, Rhode Island.	1400	0	22	22	0	32.0	4.9	56	0	124	100	91	0	..	..	7–16
		3	25	25	0	30.4	4.9	44	7	129	..	90	2	..	..	7–17
Station B, Philadelphia Gas Works Co., Philadelphia, Pa.	1380	23	90	..	..	32.0	5	90	10	90	80	92	40	12	6	..
Harrison Plant, Public Service Electric & Gas Co., Harrison, N. J.	1550	0	55	19	36	35.0	4	79	0	67	60	77	0	12	5	..
		22	90	54	36	19.5	4	79	19	75	60	48	36	14	5	..
East & West Stations, Washington Gas Light Co., Washington, D. C.	1475	15	30	30	0	....	4	55	17	36	31	84	31	36	12	..
		0	20	20	0	....	4	58	24	62	29	82	10	10	5	..

"In such cases, stills of some sort are usually resorted to, although it would generally be of economic advantage to use oils of a different character. We see no necessity for the use of stills for the preparation of 'liquid fuel' tar, but for commercial tar (for sale or use) some still equipment is necessary."

Topped Crudes

The Public Service Company, Harrison Plant, reports the use of Topped Crudes. This oil compares with the heavy enrichment oil used at Citizens Works, with respect to operating results. Reforming was carried out without any great dehydration difficulties.

Heavy Fuel Oils

The Philadelphia Gas Works Company, at Station B, reports the use of low gravity heavy fuel oils. These oils have normal enriching value and were used for reforming. However, dehydration is performed entirely by the use of Stills.

Special Gas House Heavy Oil

A special gas house heavy oil is being used at the East and West Stations of the Washington Gas Light Company, but most of the enrichment is effected by the use of natural gas. 50% of the oil used is reformed. The tar emulsion made is very viscous and some difficulties were experienced in handling. Dehydration is not carried out to completion as the tar is used as boiler fuel with 20-25% water content. They state that if they were manufacturing a higher B.T.U. gas with the use of heavy oil it would be necessary to make certain changes in their tar dehydration system.

Tables No. 2 and No. 3 give the operating results and gas making cycles at the plants considered.

Dehydration of emulsion has been carried on by a number of methods, all of which have some relation to one another. These methods are as follows:

BROOKLYN UNION GAS COMPANY

Citizens Works

Plant drains are collected in one separator and the emulsion is pumped to the separator which receives the wash box drains. From this point the emulsion is pumped continuously into each treatment tank about halfway up.

Each tank has three banks of steam coils near the bottom. Full boiler pressure (140#) is maintained in these coils.

Emulsion continuously drawn out through a throttled 1¼" valve, runs to the stills, the rate being varied to control the water content. Clear water overflows continuously from the top of the tanks. The temperature of the liquid 8' from the top is about 195°F.

Stills are filled to the half-way mark and 30 lbs. of steam turned on the coils, this pressure being gradually increased until the tar is dry. Vapors are condensed and the light oil is separated and stored.

TABLE NO. 3—TAR DEHYDRATION EQUIPMENT

PLANT & COMPANY	Heating Apparatus Used	Actual Equipment	Cap. per Unit, gallons	Heating Surface, sq. ft.	Steam Pressure, lbs. per sq. in.	% Water Inlet	% Water Outlet	Gals. Dry Tar per M.	Gals. Distillate per M.	Steam Used per gal. Tar
Coney Island Plant, Brooklyn Borough Gas Co., Brooklyn, N. Y.	Holders	1—109' x 31'	1000000	....	....	40–60	15–20	.....	.....	.....
		1— 55' x 26'	350000	....	....	15–20	7–8	.....	.....	.....
	Tanks	2— 21' x 21'	50000	81.5	100	7–8	1.	.9–1.0	0	.....
	With heat exchanger.			(Heat Ex.)						
Citizens Works, Brooklyn Union Gas Co., Brooklyn, N. Y.	Tanks	2— 20' x 50'	115000	485	140	50–60	10–30	.....	.....	.....
	Stills	4— 10' x 36'	21900	1515	30–70	10–30	1.0	.84	.05	5.37
	Tanks	3—	400000	746	150	40–60	2–15	.....	.....	.....
Astoria C & D House, Astoria Light, Heat & Power Co., Astoria, L. I.	Stills	1— Flash	.....	....	....	2–15	2.0	1.09	.022	.....
Hunts Point Plant, Consolidated Gas Co., New York City.	Tanks	3—	200000	480	150	60–70	2–15	1.14	.018	.....
Newport Gas Light Co., Newport, Rhode Island.	Tank	1— 6' x 20'	4200	200	0–60	50	3–6	.....	.....	2.5
Station B, Philadelphia Gas Works, Philadelphia, Pa.	(With a tar dehydrator)			(Approx.)		(Est.)	up to			
	Stills	.....	10000	475	100	30–55	2.0	1.04	0.1	5.73
Harrison Plant, Public Service Electric & Gas Co., Harrison, N. J.	Separator	1—	235000	....	....	.....	.....	.....	.....	.....
	Tanks	4—	75000	490	100	60	10–20	.....	.....	.....
	Stills	4—	12000	638	100	10–20	0–3.0	0.85	0.03	.....
East & West Stations, Washington Gas Light Co., Washington, D. C.	Tanks (Small with recirculating tar dehydrator)		.....	....	....	55–60	20–30	.....	.....	.....

TABLE NO. 4—EMULSION & TAR ANALYSIS AT PLANTS USING HEAVY OIL

COMPANY	Brooklyn Borough Gas Co.	Brooklyn Union Gas Company			Consolidated Gas Company C & D Astoria	Consolidated Gas Company Hunts Point	Newport Gas Light Company	Philadelphia Gas Co.	Public Service Gas Co.	Washington Gas Co.
Amt. of Reforming	4 gal.	0	*0	30 gal.	0	0	3 gal.	23 gal.	22 gal.	15 gal.
Emulsion Analysis							50	30–55	.....	60–80
% Water	40–50	53.74	39.73	59.55	40–60	60–70	.....	10	.....	.....
% Light Oil	.....	7.73	8.22	8.02	.....	.....	.....	.....	.....	.....
% Asphaltenes	.....	20.11	22.20	19.22	.....	.....	.....	12*	.....	9.0–28
% Free Carbon (Dry Basis)	.....	6.27	8.82	13.97	8–10	10–12				
Dry Tar Analysis							3.9	Up to 2.0	1.0	20–30
% Water	1.0–2.0	1.4	1.1	2.5	3–15	3–15	.....	.....	To 300° C.	.....
% Light Oil	1.5	1.2	1.0	0.8	1.3	3–5			21.0	
% Asphaltenes	27.56	.....	30.34	28.95	.....	.....	.....	.....	.....	.....
% Free Carbon	13.2	8.25	9.06	14.33	10–12	12–14	19.26	.....	12.5	.....
Specific Gravity	1.19	1.1790	1.1781	1.2094	1.19	1.20	1.2421	1.146	1.189	1.15
% Ash	0.10	0.31	0.23	0.35	.....	.....	.....	0.31	0.2	.....
Flash Point	263	234	193	245	.....	.....	.....	.....	.....	.....
B.t.u. per Gallon	168000	163662	162499	166083	160000	162000	.....	.....	165000	.....
Viscosity, Saybolt Univ. @ 210° F., sec.	489	268	426	464	475–1475	475–1475	.....	670	320	.....

* These results obtained while using Heavy Enrichment Oil.

CONSOLIDATED GAS COMPANY

Astoria and Hunts Point

"From separator through Andale heater @ 240°F to 'process' tank; live steam on coils during filling and subsequently for 6-8 hours, sometimes longer, depending on character of material. Then a period of 10 hours 'settling' with steam off, sometimes longer if time permits.

"Separation takes place very consistently, producing tar with 2% to 15% water content, entirely suitable for use as boiler fuel. A form of pressure-flash dehydrator at Astoria is used for tar to be sold for commercial purposes. Possibly 5-10% of the higher water content material is reprocessed with the next batch."

BROOKLYN BOROUGH GAS COMPANY

Emulson from all parts of the plant is collected and pumped into operating relief holder kept at 170°F by means of 4 steam jets placed one foot from the bottom. Emulsion, with 15 to 20% water content, is taken out, as required, to keep the tank of a smaller relief holder, with a capacity of 350,000 gallons full. This emulsion is continuously circulated through an old upright water tube condenser, heated by exhaust steam, and back into the holder at 4 different points. When taken out, emulsion has 7 to 8% water content.

The temperature at outlet of heater is 205°F and average temperature in holder is 180°F. As tar is required for shipment or for boilers, it is drawn from this holder and pumped at 60 lbs. pressure through a heat exchanger where live steam at 100 lbs, raises it to 305°F. It is then sprayed into either one of two 50,000 gallon dehydrator tanks with one bank of coils, spaced 9" apart, supplied with high or low pressure steam. This final operation requires 24 hours for a 50,000 gallon batch and is performed as required to keep these two tanks, along with a 200,000 gallon tank full ready for sale or use.

PUBLIC SERVICE GAS & ELECTRIC CO.

Harrison Plant

Emulsion is pumped from separators into a 235,000 gal. receiving tank. This tank is used as supply for 4—75,000 gallon settling tanks.

A 75,000 gallon settling tank is filled in 3 hours during which time steam coils bring temperature up to 200°F. Emulson is then maintained at 200°F for 12 hours. Steam is then shut off and emulsion settles for 12 hours. Free water is drained off and remainder of emulsion pumped to dehydrating stills. Total cycle takes 36 hours.

PHILADELPHIA GAS WORKS CO., Station B.

Emulsion flows to tar separators from which wet tar (30-55% water) is drained and then pumped to steam stills. In these stills the wet tar is heated up and the water that separates is decanted off. The remainder of the water is evaporated and the vapors are condensed in water cooled condensers. The condensed oil and water is collected in receiver and the oil decanted off.

WASHINGTON GAS LIGHT CO.

West Station

All the tar made during the process of the manufacture of water gas at West Station is collected in two separators.

The tar coming from the wash boxes, condensers, and precipitators, is a heavy viscous liquid containing anywhere from 60% to 80% of water. It is pumped from the bottom of these two separators to another separator, from which it is pumped into several small tanks, all of which are equipped with steam coils for heating. The tar is gradually removed from these tanks and put into a Gas Machinery circulating tar dehydrator. The tar entering the dehydrator is approximately 55% to 60% water. The Gas Machinery tar dehydrator is a circulating system in which the tar passes through a tubular heater where it is heated by steam and then is flashed at the higher temperatures into a tank. From the bottom of this tank it is recirculated through this system. The steam and light oil vapors coming from this circulating system are collected and passed through a jet condenser. The resultant condensate is collected, separated, and the oil derived from the separation is put back into the tar. The tar leaves the dehydrator system with from 35% to 40% water content. It is then stored into other heated tanks and after it has a water content of less than 30%, it is transferred to the boiler storage tanks from which it goes to the boilers.

WASHINGTON GAS LIGHT CO.

East Station

The East Station system is very similar to the West Station system with the exception that at East Station there is no circulating tar dehydrator. Various small tanks equipped with steam coils are depended upon for dehydration of the tar. This is done with ease at the present time and the tar going to the boilers runs between 20 and 25% water content.

NEWPORT GAS LIGHT CO.

48 Hour Cycle

(1) "Pump from tar well to tank applying steam as tar is admitted at 60# sq. in. and remains on after tank has been filled until temperature of tar ½ distance to top of tank has reached 200°F. Maintain at this temperature, plus or minus 5°F, for 26 hours. Shut off steam and permit

(Continued on page 60)

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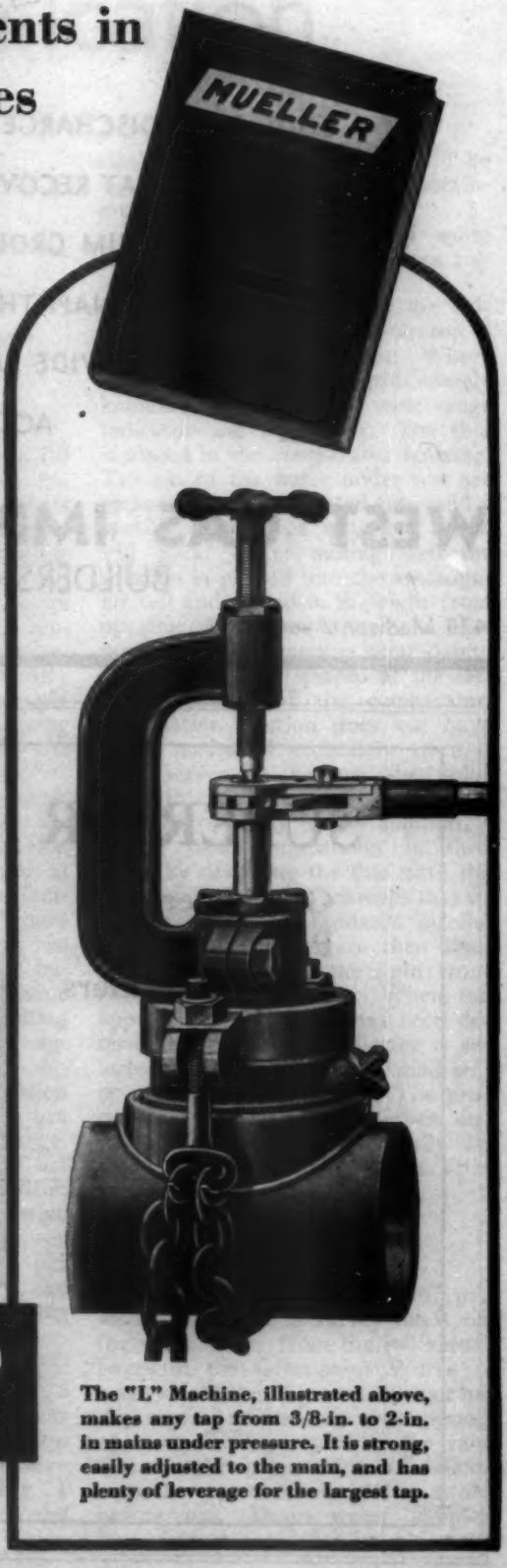

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The Control of Alkalinity In Dry Box Purification

By

E. J. Murphy

Assistant Chief Chemist
The Brooklyn Union Gas Company
Brooklyn, N. Y.

THERE is sufficient evidence in the literature to indicate that iron oxide purification material maintained in an alkaline state will function with a greater degree of efficiency than will one allowed to become acid.

The practice of incorporating lime or soda ash with the oxide mass is well known as a means of producing an alkaline condition. This procedure undoubtedly assists in attaining the desired effect; but the problem is ever present as to how long the condition of alkalinity persists. Acid products are regularly being generated so that the need for neutralizing these products is apparent.

It is the purpose of this paper to describe a method which has been in use nearly four years in The Brooklyn Union Gas Company for controlling alkalinity of the oxide mass continually during its entire life and to relate the results obtained. The method merely requires a knowledge of the pH value of the drain water from the individual boxes and the use of small concentrations of ammonia. No particular technique is involved either in performing the necessary tests or in applying the ammonia.

Meaning of pH

It is not intended to develop a complete discussion of pH values in this paper. However, a practical explanation seems necessary in order to serve those who are not acquainted with the expression.

The pH scale is used to denote intensity of acidity or alkalinity. Actually a pH is defined as the log of the reciprocal of a hydrogen ion concentration. Numbers from 0 to 14 on the scale are used to express pH values, that is, intensity of acidity or alkalinity. The pH value 7.0 midway on the scale is called the neutral point. The pH values below 7.0 indicate acidity, the intensity increasing as the numbers decrease. Thus, a solution of pH 6.6 is very slightly acid, one of pH 5.0 more intensely acid and one of pH 4.0 still more intensely acid.

Conversely pH values between 7.0 and 14.0 indicate alkalinity, its intensity increasing as the numbers increase. For example, a solution of pH 7.2 is very slightly alkaline while one of pH 8.0 is more intensely alkaline and one of pH 10.0 still more so. These numbers accurately represent degrees of acidity or alkalinity. A statement such as "acidify to pH 5.0," or "make alkaline to pH 9.0," has a very definite meaning which cannot be expressed by the terms "slightly acid or alkaline."

For making pH determinations, substances known as indicators are required. An indicator is one that gives colors or shades of color at different pH values. Thus the indicator known as phenol red changes from yellow at pH 6.8 to a deep red at pH 8.4. Intermediate points between these two values will assume varying shades of color becoming deeper in red as pH 8.4 is approached. This indicator just described covers only a limited portion of the pH scale so that others are necessary for the entire range. Table 1 gives a fairly complete list of indicators from which a selection can be made to meet any possible requirement.

For a scientific discussion of pH values reference may be made to the brief bibliography appended to this paper.

Determination of pH Values

The determination of pH values is made with the aid of a hydrogen ion comparator of which there are several types on the market. Fig. 1 illustrates the apparatus used in the Laboratory of The Brooklyn Union Gas Company. Other types will be found equally good in the obtainment of correct results.

The actual procedure is quite simple and may be described as follows:

Fifty c.c. of drain water are collected from each box and filtered if suspended matter is present. Where the pH value is not approximately known use is made of a wide range indicator and color disc. The disc is placed in the comparator housing. Ten c.c. of the water under test are measured in a graduated tube and a specific amount of indicator added (¼ c.c.). After mixing well the solution is poured into the rectangular cell and placed in the right front opening of the comparator. Another portion of the water is poured into a second cell and placed at the left front opening of the comparator. This latter solution does not have to be measured accurately since it only serves to balance the color fields to eliminate errors due to the color or turbidity of the solution.

The color comparison is then made by revolving the disc until the color of the solution matches that of one of the glass standards on the disc. The pH value is then read from an opening on the right front cover of the apparatus. When the approximate pH value has been determined a disc and indicator is selected on which the value found will be located about midway. The procedure as given above is then duplicated. Readings can finally be made to a tenth pH with a little experience.

The Control of Alkalinity—Coke Oven Gas

After establishing the use of pH values and from a survey made on the drain water from the individual boxes at the Greenpoint Works it was evident that the oxide mass rapidly became acid after a short period of time. This in spite of the fact that ample proportions of alkali were known to exist in the oxide before use. Drain water samples first showed a pH 8.0 for about 48

hours after which a rapidly decreasing value was obtained finally reaching pH 5.0 in the course of 7 days. It might be stated here that the material used in the purification systems of the Brooklyn Union Gas Company is of the iron boring type. While the experience to be cited here was obtained with this material it can be shown on the basis of certain laboratory experiments that the same trend of decreasing pH values will be found where other types of oxide are used.

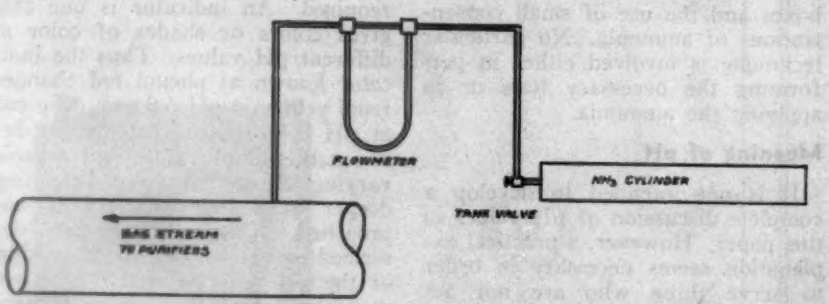
In considering the reason for the change from an alkaline to an acid condition it seemed unreasonable to believe that the normal reactions between hydrogen sulphide and iron oxide could alone cause the rapid change in pH values. Quite naturally attention was focused on hydrocyanic acid which is commonly found in crude coke oven gas. In our situation about 30 grains per 100 c.f. of gas represents the concentration generally obtained.

To state that hydrocyanic acid is a direct cause of acid formation in the boxes is probably not true. But through a combination of reactions with sulphur and soluble ferrous salts a condition arises which becomes a real and potent factor in the creation of acidity. One end product always possible is ferrous sulphocyanide which in solution is of a strong acidic character and where pH values in the acid range are obtained on the drain waters this substance can invariably be identified. The facts regarding the changes are not as simple as might appear to be indicated above. As Clayton[1] and his co-workers point out other sources of acidity are possible. However it seems that a salt of hydrocyanic acid is always in attendance where acid conditions prevail in the iron oxide. Some of these salts are perhaps neutral or at best only slightly acid in solution but it is known that ferrous sulphocyanide is highly dissociated in solution and consequently would produce pH values in the acid range.

Realizing that it would be necessary to deal with the hydrocyanic acid content of the crude gas before the problem of continuing alkalinity could be solved, arrangements were made to by-pass a small concentration of ammonia from the saturators to the gas enroute to the inlet of purifiers. Actually not more than 4 to 6 grains of ammonia per 100 c.f. of gas were used. The result of this procedure raised the pH value of the drain water from 5.0 to slightly over 7.0 in three days. This was particularly noticeable in the drain water from the boxes in first position which are more readily affected due to the considerable bulk of hydrogen sulphide removal occurring at this point. It was quite noticeable after the pH value was raised that beneficial results were obtained not only in better absorping ability in the first boxes but also by the increase of activity of the last boxes resulting in the removal of traces of hydrogen sulphide with greater ease. Also the hydrocyanic acid content was fixed in the boxes being reduced to zero at the outlet of the purifier house. Previous investigation showed as much as 5 grains of hydrocyanic acid per 100 c.f. of gas leaving the last boxes in series of four where the pH value of the drain water was 5.0. After treatment of the oxide with ammonia and a rise of pH to over 7.0 no hydrocyanic acid passed the second boxes. It is not necessary to call attention to the importance of preventing hydrocyanic acid from leaving the plant. Its contributing effect in the corrosion of mains and meters is already well known.

Since February 1932 when the method of alkalinity control was inaugurated a general improvement in conditions has been noted. No trace of hydrogen sulphide has since been found at the outlet of the purifier house. At the same time higher yields in the sulphur content of the spent oxide are obtained resulting in figures as high as 56%.

METHOD OF INTRODUCING AMMONIA INTO GAS



The use of ammonia for the addition of alkalinity to the purifiers is not in any sense a new idea. As a matter of fact the practice is common in England. There are, however, certain precautions in the application of ammonia that need to be stressed. It is quite essential for the flow to be as constant as possible. Not more than 4 to 6 grains per 100 c.f. of gas appear to be necessary under the conditions set forth in this paper. Clayton[2] shows that ammonia entering the boxes above a necessary amount causes the hydrocyanic acid to be fixed in increasing quantities but as ammonium sulphocyanide instead of ferrocyanide. He also points out that the formation of large amounts of ammonium salts in the oxide is a potential source of corrosion in the boxes and may give rise to serious troubles. It can be stated here quite definitely that no especial concern need be felt if care is taken with respect to the concentration of ammonia used. After several years of experience the quantity of ammonium salts as sulphocyanides was never found in excess of 3%.

Control of Alkalinity—Carburetted Water Gas Purification

As far as the carburetted water gas plant at Greenpoint Works is concerned there is no problem in maintaining an alkaline condition of the oxide used for purification. The major portion of this product is composed of refinery gas either reformed or cold enriched and it so happens that 2 to 6 grains of ammonia per 100 c.f. of refinery gas are found as a natural constituent. The pH values of drain waters from individual boxes are invariably found above the neutral point.

The purification system at the Citizens Works presents a different situation. Up to recently the pH value of the drain waters at this Works showed but little tendency toward acidity. Since the advent of the use of blow run in the cycle in connection with heavy oil operation acid formation has increased in the oxide mass. Investigation has proven the presence of 7 grains of hydrocyanic acid per 100 c.f. of gas. Prior to heavy oil operation and without blow run little more than traces of hydrocyanic acid were found.

Here, as in the case of coke oven gas purification, hydrocyanic acid passed through all boxes in the series while the oxide mass was acid. After adjustment on the alkaline side none passed the second boxes in series of four.

As it was not possible to utilize the same source of ammonia as in the coke oven boxes, arrangements were made to purchase it in cylinders. With the aid of a flow meter it was a simple matter to pass a constant flow to the crude gas at the inlet to purifiers. Fig. 2 represents the method used. The flow meter is calibrated in c.f. per hour and it becomes only necessary to regulate the required volume for a given make in order that the crude gas shall contain the desired quantity of ammonia in grains per 100 c.f. of gas.

After 96 hours of operation using 2 grains of ammonia the pH values of the drain waters were increased to a point well within the range of alkalinity or from about pH 6.0 to pH 7.5. Later it was found possible to reduce the ammonia concentration to 1 grain and still obtain a pH value above 7.0.

Control of alkalinity in the boxes at Citizens Works has been in operation only since May 1934 but there is already sufficient evidence to indicate its value. Besides enhancing the activity of the oxide, the yield of sulphur in the spent material shows a decided increase. From an average figure of about 30% of sulphur it now is found as high as 42%.

There is no particular hazard in using ammonia from cylinders. It is necessary of course that the feed line and fittings be free from leaks and that the cylinder is not exposed to freezing temperatures. It is also important to locate the ammonia intake at a point on the main not too close to the inlet of purifiers in order that ample opportunity be afforded for mixing.

Where ammonia is used as an alkaline medium it is assumed that all conditions for efficient purification are present. There would be no real advantage gained if the moisture content of the oxide was deficient to a point where the absorption of hydrogen sulphide would be materially affected. Neither would it be of any benefit to operate under temperature conditions too high for the particular oxide in use. If all the factors necessary to attain the utmost in purification are in order then the ammonia will prove to be an able ally in preventing the formation of acidity.

Effect of pH on Laboratory Testing of Oxides

In using the well known Kunberger method for testing samples of oxide, results have been obtained at times which were not at all in agreement with actual performance in the boxes. The method has condemned materials for their seemingly poor hydrogen sulphide absorping ability when actually the same materials proved in practice to be of excellent quality.

It had been noted on occasions that results obtained by the Kunberger method were appreciably affected by the amount of alkalinity present in the sample. To determine if possible something of the nature for this effect a series of experiments were conducted on carefully prepared samples of oxide in which the pH value was varied from 5.0 to 10.8. Moisture in all cases was held constant at 35% and the rate of flow of hydrogen sulphide regulated by means of a flow meter to 1 c.f. per hour. Chart 1 clearly indicates the effect on hydrogen absorption efficiency with increasing pH values. Within the acid range studied this is a slight falling off in efficiency and from about the neutral point to pH 9.9 a maximum yield is obtained. But beyond this latter point a rapidly diminishing absorption ability appears to occur. For example the hydrogen sulphide absorption at pH 8.0 is 29.7% and at pH 9.9 it amounts to 27.19%. However at pH

"The Control of Alkalinity in Dry Box Purification"

The above title of a paper by E. J. Murphy of the Brooklyn Union Gas Company, printed in this issue, discusses the problem of purification box acidity and also the effect of cyanogen compounds on the corrosion of mains and meters.

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10.8 the absorption drops to 13.85%.

It is of course natural to consider why a contradiction exists between results obtained by the Kunberger Method and those found in actual operation of the boxes. Aside from differences in the concentration of hydrogen sulphide there remains the question of oxygen. This substance is absent in the Kunberger method and present in varying amounts in crude gas entering the purifiers. It can be demonstrated that if an arbitrary mixture of hydrogen sulphide and a small quantity of air be used with the Kunberger method considerably better results are obtained. However, the influence of pH remains as shown in Chart 1, that is to say, although the presence of oxygen considerably increases the quantity of hydrogen sulphide absorbed in an oxide with a pH 10.8 the yield is still much greater where the pH ranges approximately between 7.0 and 9.0.

Why the pH value of an oxide influences its ability to absorb hydrogen sulphide cannot be definitely stated. An interesting series of experiments were performed which seem to throw some light on the problem. Four samples of an oxide were prepared and adjusted to definite pH values. After each sample was fouled once they were revivified and leached with distilled water.

Following are the results obtained:

Sample	pH Value	Color of leached solution
1	8.5	colorless
2	9.0	light amber
3	9.6	dark amber
4	10.0	dark brown

A curious fact regarding the solutions was the relationship between the color produced and a white precipitate formed on acidifying the solution. At 8.5 which was colorless no precipitate was formed but as the pH values increased with deeper colors, greater quantities of white precipitate were obtained. It was suspected by the appearance that this substance might be sulphur but tests proved negative. A sample of wood shavings such as is used to fluff oxide was then treated with a solution of sodium carbonate having a pH value of 10.8. After a leaching process of one hour the solution was colored brown and on making acid a considerable quantity of white precipitate was found identical to that leached from the revivified samples of oxide. The exact nature of the white precipitate is not known at this time but it is shown to be a constituent of the wood shavings.

With reference to the Kunberger method, the effect of the white precipitate might be in the formation of a film on the oxide, increasing as the pH value of the oxide increases. This film perhaps retards the reaction between hydrogen sulphide and iron oxide. At least this theory appears to be a possibility. There is, of course, much more work to be done before any definite conclusions can be arrived at. It is expected to carry on further experiments which will perhaps finally give an answer to the problem.

In concluding this paper it is hoped that the method described for the control of alkalinity will help those who are desirous of maintaining an alkaline condition in their purification systems. It is certain that the investment made in a hydrogen ion comparator will many times repay itself in a short space of time.

Bibliography on pH Values

1. pH and its Practical Application, by LaMotte, Kenny & Reed.
2. A. B. C. of Hydrogen Ion Control, by W. A. Taylor.
   This pamphlet contains much valuable information and may be had free of charge from The LaMotte Chemical Products Company, Baltimore, Maryland.
3. Modern pH and Chlorine Control, by W. A. Taylor & F. R. Crumb. This is another free pamphlet obtainable from W. A. Taylor & Company, Inc., Baltimore, Maryland.

Indicators Used for pH Values

Indicator	pH Range	Color Change
Bromphenol Blue	3.0- 4.6	Yellow-Blue
Methyl Red	4.4- 6.0	Red-Yellow
Bromcresol Purple	5.2- 6.6	Yellow-Purple
Bromthymol Blue	6.0- 7.6	Yellow-Blue
Phenol Red	6.8- 8.4	Yellow-Red
Thymol Blue	8.0- 9.6	Yellow-Blue
Phthalein Red	8.6-10.2	Yellow-Red
Tolyl Red	10.0-11.6	Red-Yellow
Parazo Orange	11.0-12.6	Yellow-Orange
Acyl Blue	12.0-13.6	Red-Blue

Gas in the Preparation of Smoked Food

By Our Representative in Australia

Australians consume a good deal of small goods of one kind or another, at least in the cities, and manufacturers in these lines drive quite a thriving trade. For many years however, there has been a call for better smoke house equipment and the need has been met by the use of gas. The Australian Gaslight Company was called into consultation by Thomas Playfair and Company, a large Sydney firm of meat purveyors. In the past, this firm created smoke in the smoke houses by making a fire of wood upon which sawdust was burnt, the vapors distilled giving the meat the peculiar flavour desired. The regulation of temperature and distribution of the vapours presented considerable difficulty, but Playfair and Co. have now installed specially designed gas equipment to burn the sawdust. The smoke houses are eight feet long, by four feet wide, by eight feet high. The burners which are of the natural draught tube type are placed along each side of the smoke room about 8 inches from the floor. A horizontal flame is played onto the sawdust which is heaped alongside the burners. The A. G. L.'s method permits of a constant temperature and there is an even distribution of the smoke fumes throughout the room. The turning of a tap regulates the supply of gas.

Zorn Named Vice President Gas Company

G. J. Zorn, secretary-treasurer of the Muskegon Gas company for the past 10 years has been elected vice president succeeding James Lawrence, of Chicago, vice president and treasurer of the American Light and Traction company.

Mr. Zorn entered the employ of the local subsidiary May 24, 1920. He also was named secretary-treasurer of the American Michigan Pipe Line company, another local subsidiary of the A. L. and T., when it was organized last year to pipe natural gas here from the Austin township, Mecosta county field. Mr. Lawrence had been a vice president of the local subsidiary since 1910.

"SUCCESSFUL SELLING"

The Crowning Event of 1935

By G. W. Godwin

Advertising Manager
Mississippi Power & Light Company
Jackson, Miss.

THE theme of Mississippi Power & Light Company's 1935 residential sales program proves the worth of the old saying, "necessity is the mother of all invention." Beginning April 1st and continuing for three months, the most comprehensive sales drive in our company's history was launched under the slogan "The Crowning Event of 1935" and carries an invitation to each homemaker to "Crown Yourself Queen of Yohomia—the empire within the walls of your home."

The word "Yohomia" is the center around which the entire activity was planned and in using it, one very naturally thinks of the popular song, "Pardon My Southern Accent," for it is simply a pure southern pronunciation of "Your (Yo) Home" with an "ia" and a little romance thrown in for good measure.

Need for Recovery

The aftermath of a substantial residential rate reduction made it necessary for our company to secure revenue recovery. It was realized that such recovery, in a large measure, must come from the wired homes already on the company's lines. An analysis of the communities served showed that over sixty per cent of present customers were still prospects for almost every important service our company has for sale. Ninety to ninety-five per cent live in homes over eight years old, which all need modernization of either structure or furnishings and appliances, or both. Twenty to forty per cent have a new occupant every year, all of which presents new sales prospects to an alert sales organization. The national surge towards home modernization made the Mississippi home our company's market for the sale of its services and its hope for revenue recovery in 1935.

To Attract Attention

This matter of revenue recovery could not wait. It was a matter both important and urgent. Therefore, a mass selling drive was planned, to embrace our company's regular sales organization, special junior salesmen, all dealers, and employees, in a ninety-day mass selling drive, featuring ten major home servants or appliances. To focus public attention upon this activity and let the general public know that something unusual was taking place in the gas and electric business, it was necessary to launch the activity under a new, fresh, and, if possible, an interest-compelling slogan.

Since romance and the stories of kings and queens have a direct appeal to a large majority of women of all ages, as well as to most men and children, and since stories of make-believe kingdoms have always proved popular, the kingdom of Yohomia—the empire within the walls of your home—came into being. And since every woman would love to have a host of servants at her command, as did the queens of history, it was only natural that the invitation to each homemaker should be "Crown Yourself Queen of Yohomia."

A queen's crown was designed, with the words "Complete Home Service" engraved thereon and the jewels in the crown consisted of the ten services featured in the campaign. The invitation to "Wear this crown of freedom—it costs only a few cents a day," adds to the appeal of the sale drive and caused the entire activity to be named, "The Crowning Event of 1935," since the purpose of our organization and cooperating dealers is primarily to sell gas and electric service and thus enable Mississippi women to crown themselves queen of their homes.

Yohomia

The drawing of an attractive home with the word "Yohomia" directly under is the emblem of the activity and is displayed in all publicity. This ties in directly with the home modernization plans of the government and since utility services are essential, if there is to be in truth, real modernization, the word was quickly taken up by the public and wherever seen or heard in our entire territory, its full meaning is immediately understood.

Ten Home Servants

Gas and electric refrigeration, gas and electric cookery, gas and electric water heating, ventilation, washing machines, table-top ironers, vacuum cleaners, dish washers, improved lighting, and radio, comprise the ten home services featured, and prices and terms are on a normal basis. It was felt, and sales so far in the activity have proved that the surmise was correct, that, with the low cost, improved quality, and easy terms upon which these appliances can be purchased, comprehensive sales work and strong coordinated advertising directed toward a receptive market would secure the desired results without the usual campaign offering of special prices and terms.

Quotas by Sales Districts

Quotas for "The Crowning Event of 1935" were broken down for each of the eight sales districts of the company and a special dealer quota and company quota were set for each district on each of the ten services featured. The total quotas are as follows: refrigerators, 1500; electric ranges, 150; electric water heaters, 100; gas ranges, 1000; gas automatic water heaters, 200; gas tank water heaters, 200; and miscellaneous appliances, 2000 units. Miscellaneous appliances included ventilating fans, washers, ironers, vacuum cleaners, radios, dish washers, and I.E.S. Approved Lamps.

Point Basis

As a basis for intercompany contests, the entire quotas were further broken down on a point basis. Re-

frigerators were given 30 points, electric ranges 36, electric water heaters 45, gas ranges 8, gas automatic water heaters 16, gas tank water heaters 12, and miscellaneous appliances 5. The total quota totals 78,500 points.

Cooking Schools

Feeling that homemakers were tired of the usual cooking school, with which they have become so familiar, we planned a series of entirely new and strictly modern exhibitions. The home economist of the company very naturally conducts an interesting cooking school during the show, just as in the past, but each lecture is preceded by two entirely new features.

Sound Movie

The first of these features is a sound-movie, "The Queen of Yohomia." When the school opens, those present are welcomed to "The Crowning Event of 1935"—the name by which each show is advertised—and the lights are turned out and a fifteen-minute sound film shown. The film is packed full of human interest for women. It opens with a church wedding and the music is the wedding march. This scene was placed in the film because all women, who had a church wedding, remember it as the high-point of their life, and those who did not have such a wedding, possibly look back and wish that they might have had. Immediately following the wedding scene, the young couple are seen slipping away from the reception and driving off on their honeymoon. The proud groom, as he picks up the young bride, says "Honey, I'll never let you down." The off-stage voice says, "She was queen for a day (speaking of her wedding day), will Dick live up to his promise, "never let her down?"

Honeymoon scenes follow and finally a scene where the bride says, "Today is the last day. Tomorrow you will be a business man instead of a groom and I'll be just another housewife." She then tells of some of her plans for the newer and modern things for the home and he answers that he must spend slowly so as to get firmly established in business, and adds, "Anyway, I like old fahioned living and old fashioned cooking."

They return to an average home, with average furnishings, but no modern conveniences. She quickly becomes slave to household drudgery and toil. Most women, after their honeymoon, find married life less thrilling than expected, and this change meets with the approval of most everyone in our audiences. The off-stage voice says "She was Queen for a Day, now she is a household slave." The water is slow heating each morning, the toast does not meet Dick's taste, and the coffee is rotten. He gets as cross as a bear and Dot telephones her mother that things are not getting along so well.

Finally she pushes an out of date carpet sweeper across the living room and drops in a chair to rest. She falls asleep and dreams that the door bell rings. She goes to the door and meets a little fellow dressed in a Sir Walter Raleigh costume. He greets her with "Greetings, Queen of Yohomia." She replies, "Yohomia, queen, what do you mean?" The little fellow then says, "Why, Yohomnia is the emprice within the walls of your home and you are its queen." Dot, with emphasis, says, "I'm no queen, I'm a slave."

The little fellow calls her attention to the living room, she turns and finds a modern radio in place of their out-of-date set. Modern I.E.S. lamps have replaced the poor lighting. A modern vacuum cleaner

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Summary of Sales Activities for . . .

"The Crowning Event of 1935"

1. EMPLOYEES — will devote their entire time to the securing of live prospects and filing prospect cards.

2. HOME ECONOMISTS — will conduct "The Crowning Event of 1935" modernization shows throughout the territory. During the time that the shows are not active in their respective territory, Home Economists will, of course, take care of home service calls, conduct floor demonstrations, and handle general routine duties that come under their department. They will, of course, file prospect cards on any and all customers contacted.

3. LOCAL MANAGERS — will hold employees meetings, contact dealers, and be personally responsible for all preliminary preparation for "The Crowning Event of 1935" home modernization show when it visits their community. They will also encourage the filing of prospect cards by the employees under their supervision and hold daily meetings with Junior salesmen.

4. SALES SUPERVISORS — will be responsible for "The Crowning Event of 1935" home modernization shows. They will closely follow these shows; assemble prospect cards filed by Junior salesmen and employees, classify such prospect cards, and distribute these cards to Senior Salesmen and appliance dealers. A complete list of all prospects thus distributed must be made and a copy of the prospects assigned to salesmen, and of those prospects assigned to dealers, must be placed in the hands of the local manager, and a copy mailed to the Residential Sales Manager in Jackson, and the Sales District Captain.

5. SENIOR SALESMEN — will not accompany "The Crowning Event of 1935" home modernization show but will devote their entire time to the actual closing of sales. They will be expected to cooperate fully with all independent dealers in their respective territory and will be expected to follow up closely and report fully upon the prospect cards turned over to them by their Sales Supervisor.

6. STATE DEALER CO-ORDINATOR — will contact dealers throughout the entire territory as rapidly as possible after the beginning of this activity in an effort to receive the full cooperation of all appliance dealers in the sale of the appliances featured. He will also stress the importance of the dealer weekly reports so that full credit may be received for all appliances sold during this event.

7. DEALER CONTACT — the work of the State Dealer Co-ordinator will not supplement the usual dealer contact work by managers, sales supervisors, and senior salesmen. For this event to be as successful as we expect, the State Co-ordinator, the manager, the sales supervisor, and the Senior Salesmen must continue to work hand-in-hand with the dealer in the interest of selling and in the securing of proper reports after the sales are made.

8. CAPTAIN OF JUNIOR SALESMEN — one member of each of the two squads of Junior salesmen will be selected as Captain of his squad. He will be responsible for the four men under his supervision, the Castle-on-Wheels assigned to his group, the erection of "The Crowning Event of 1935" show, and the actual presentation of the sound film, "The Queen of Yohomia". One man on each squad will be trained as property man, whose duties will be to erect and dismantle the stage setting and operate the sound projector. He will also act as usher at each of the home modernization shows. While he is doing this work, with possibly the aid of one or two men employed locally, the other four members of the Junior Salesmen squad, including the Captain, will make a house-to-house canvass. They will call from door-to-door, delivering personally invitations to homemakers to visit the show and inviting them to visit the Castle-on-Wheels which will be located in the street. In this manner the Junior Salesmen will do a splendid contact work and should, in addition to selling a certain volume of merchandise, secure a large volume of live prospects.

9. JUNIOR SALESMEN — will, of course, close all possible sales, but will have as their important duty the securing and filing of prospect cards on customers contacted. They will be expected to turn in a report on each customer contacted. Cards will be provided for these reports. The Captain of each squad will be provided with a daily report blank which must be filled in and mailed each night to the Residential Sales Manager at Jackson. Individual quotas will be assigned to each Junior Salesman and weekly progress bulletins will be issued showing the work accomplished by these men.

10. EMPLOYEES MEETINGS — Local Managers, Sales Supervisors and Senior Salesmen should all be interested in holding employee meetings at least once each week at which time details of "The Crowning Event of 1935" are discussed in full and employee's enthusiasm kept at a peak.

11. OUR JOB — Every member of the Mississippi Power & Light family has a definite work to do in order to crown thousands of Mississippi women queens of their homes during April, May and June. A definite assignment has been made to each and every one, and if this assignment is carried out as outlined then success will crown our efforts. Step out and sell!

Report Sales Promptly . . .

It is essential in a mass selling drive of this type that all sales be reported promptly to the Residential Sales Department in Jackson.

You may be making an outstanding sales record in your territory but unless the Residential Sales Department secures an official report of each and every sale you will, of course, fail to receive proper credit. All managers, salesmen and sales supervisors should be very prompt in reporting every sale in their respective territories. This will not only enable them to receive full credit for the work they have done but will greatly facilitate the issuing of progress bulletins and other sales promotional literature.

Step out in 1935 and score a new record — that of reporting each and every sale promptly.

Special Yohomia Sales Reports . . .

The following special sales reports have been prepared in an effort to enable everyone to promptly report all sales during "The Crowning Event of 1935."

DEALERS' WEEKLY REPORTS

Dealers will be asked to fill out confidential weekly report so that a closer check may be kept on the progress made during "The Crowning Event of 1935."

SENIOR SALESMEN'S DAILY REPORTS

Senior salesmen will be expected to mail regular daily reports on the progress of "The Crowning Event of 1935" on regular blanks that have been provided.

JUNIOR SALESMEN'S DAILY REPORTS

A special daily report for the captain of each of the two teams and for each individual junior salesman have been prepared and must be filled in and mailed daily.

HOME ECONOMISTS' DAILY REPORTS

A special daily report for Home Economists will be available so that the Residential Sales Department may keep a close check on the attendance and progress of "The Crowning Event of 1935" shows. This daily report of the Home Economists will not take the place of the Home Economists' regular written weekly reports. A complete summary of the week's activities will be expected from each member of our Home Service Department.

CHIEF CLERKS' WEEKLY REPORT

A special weekly report has been printed for use by Chief Clerks in reporting the names and locations of employees to whom commissions have been paid during "The Crowning Event of 1935". Chief Clerks are urged to mail reports each week so that employees throughout the territory may receive full credit for their participation in this event. Where Chief Clerks handle details for two sales districts they are requested to fill in an individual report for each district.

SALES SUPERVISORS' WEEKLY REPORTS

Sales Supervisors will be expected to write their individual weekly reports covering all phases of activities in connection with "The Crowning Event of 1935."

CROWN YOURSELF QUEEN of YOHOMIA

has replaced the old floor sweeper. She oh's with pleasure. He then takes her to the kitchen, where a modern built-in kitchen has replaced the wood stove and ice box. And then, to a modern laundry, where an automatic water heater is in view.

The scene flashes back to the living room, with the door bell again ringing. This time, it is real. Dot is aroused by the bell and arises to admit Dick. She tells him of her dream and persuades him to accompany her. They are seen walking down a business thoroughfare in front of a window filled with household appliances. On the window can be seen the sign, "Your Appliance Dealer." They enter and the dealer gives them a brief sales talk covering the range, refrigerator, water heater and several other appliances. Dick is convinced and the next morning, we find Dot singing as she prepares breakfast in the modern built-in kitchen of her dreams. Dick comes in early, due to an abundance of hot water, and takes her in his arms, saying, "Honey, things sure have changed for the better around this house."

Dick is then seen leading Dot by the hand toward a throne. He places her thereon, and the little fellow appears with a crown on a cushion. Dick places the crown on Dot's head and the off-stage voice says, "She was queen for a day, now Dick crowns Dot his queen for life." Immediately thereafter, several women in house dresses pass by the little fellow and take a crown from his hand and place it on their heads. The off-stage voice says, as they pass quickly, "The way to freedom is open to every woman—you too can crown yourself Queen of Yohomia."

Beauty Contest

As the curtain rises and the lights come on, a beauty contest is conducted. Each appliance dealer is invited to enter some young lady as a contestant in a Queen of Yohomia contest and each day of each school they parade and the audience votes on card provided for the occasion. The card serves a dual purpose. One side is for voting and the other for the name and address of the voter, with space for certain information concerning appliances in which the voter may be interested.

On the last day of the beauty contest the votes are counted and the winner is officially crowned at a fitting coronation ceremony. Special crowns are provided for this occasion and suitable gifts are awarded the winning young lady. The company does not enter a contestant.

Lovely Modern Kitchen, Truly Fit for a Queen

This feature has proved very popular and greatly stimulates interest and attendance.

Special Stages

Special stages were built for the cooking schools. Each stage consists of pipe, fitted together so that it may be quickly put up or taken down. Curtains are quickly attached to the pipe, forming a stage in the center with curtains on each side. Across the top is a panel on which is printed "The Crowning Event of 1935." A screen is pulled down in front of the stage and the sound-movie is shown thereon. The screen works on a roller and is raised out of view at the end of the movie. The stage is then used as a kitchen, being raised some twelve inches off the floor. The stage is nine by twelve feet and consists of three packing crates, each three by twelve by one. The pipe, curtains, and other equipment is placed in the three crates that form the platform and carried from town to town.

Two of "The Crowning Event of 1935" shows are touring the company's property and will visit 53 communities for from one to four-day stands during the period of the campaign.

Manager's Activity

The manager of the community where the show will be presented is notified at the beginning of the activity and it is his duty to secure a vacant building for the event, invite all appliance dealers in his town to have an exhibit in the building, arrange all details for the Queen of Yohomia beauty contest, mail invitations to all customers and to preside daily over the program at the school. This procedure places the local manager directly into the center of the activity and brings him into contact with a large number of customers.

Castle on Wheels

Two castles on wheels form an important part of "The Crowning Event of 1935." The castles consist of a truck with a large body thereon. The body is shaped like a room with steps and a door at the rear. Within the body will be found all ten of the appliances featured, securely fastened to the floor, yet presenting an attractive appearance. The exterior of the body has been worked over to look like a castle and, in truth, each of the two trucks look exactly like castles of old. These "Castles on Wheels" accompany "The Crowning Event of 1935" cooking schools and go into the residential sections of the communities visited where homemakers are invited to visit them and inspect the modern slaves that they contain.

Junior Salesmen

Each truck has five junior salesmen assigned to it. These junior salesmen are known as "Knights of Yohomia" and they make a house-to-house canvass of each town visited. This canvass, going on during the cooking school, further stimulates interest in the entire campaign. The knights also act as prop men in handling the stage equipment and the three packing cases are placed in the center of the truck, between the appliances, and are transported in this manner from town to

(Continued on page 70)

Are You Equipped to *of the*

WITH **VULCAN** INSULATED RANGES

66 2/3% LESS SHRINKAGE

GAS AND REFRIGERATOR COSTS GO DOWN

UPKEEP COST WILL DROP

To help *you* sell more gas — and more gas ranges, Standard Gas Equipment Corporation has financed one of the most intensive and extensive direct mail and trade paper advertising campaigns ever undertaken by a gas range manufacturer.

We've paved the way and now it's up to you to follow up with your representatives, contact these prospects, and clinch the sale. That's something that has to be done on the spot—by you.

Every new Vulcan installation brings further evidence of the superiority of gas over other types of fuel. The proof is found in hundreds of kitchens where Vulcan not only has reduced fuel cost but has also reduced shrinkage and refrigeration cost and always improves working conditions. Read what satisfied users say—

Hotel Savoy, Kansas City, Mo. "A saving of 46.3% in fuel cost." (Vulcan replaced old gas ranges.)

The Parker House, Boston, Mass. "Effected a saving in excess of 25%.

Hotel Sherman, Chicago, Ill. "but the average saving per month is nearer $400.00 than $300.00." (Vulcan replaced gas-fired coal ranges.)

University Club, Los Angeles, Calif. "there has been an approximate saving of 40%." (Vulcan replaced gas ranges.)

Hotel Roosevelt, Pittsburgh, Pa. "the savings paid for new equipment in three months." (Vulcan replaced electric.)

Rosoff's Restaurant, New York City. "our gas bills have been cut from an average of $400.00 per month to $300.00.".. (Vulcan replaced old gas ranges.)

STANDARD GAS

18 EAST 41st STREET, NEW YORK, N. Y.

Handle Your Share Business Created?

But there's no use going after this rapidly increasing business unless you have enough equipment on the floor to demonstrate to your prospects. So find out NOW—TODAY—how complete and up-to-date YOUR stock of Vulcan Ranges is. And then write or wire us immediately telling what you need. Shipments will be made at once. This is a matter that should be acted on without delay, if you are to get the business that has been created for you.

VULCAN

Gas Ranges have been approved by A.G.A. Laboratories.

At West Point Military Academy, New York. "46% savings in cost of cooking." (Vulcan replaced coal.)

Copley Plaza, Washington, D. C. "42% below coal costs, a proven fact I did not think possible."

Kansas City Country Club, Kansas City, Mo. "approximately 33% saving in fuel cost with an increased business.

Seneca Hotel, Rochester, N. Y. "our saving in gas consumption is about 25% over former gas equipment."

The Pontiac, Oswego, N. Y. "a reduction in consumption of 39.4%. The economy effected is more than we expected."

Cumberland Hotel, Bridgeton, N. J. "we have benefited not only by substantial savings but in a cleaner kitchen." (Vulcan replaced coal.)

The Broadmoor, Colorado Springs, Colo. "a considerable saving over our previous electric equipment." (Vulcan replaced electric.)

Essex County Hospital, Cedar Grove, N. J. "figures show a saving of 27.7% in fuel and better than $200.00 per month." (Vulcan replaced old gas ranges.)

This folder has been sent to a total of 28,548 hotels, restaurants, hospitals, school board officials, gas utilities and equipment dealers. Graphically it tells the story of WHY and HOW *gas* is the cheapest, cleanest, quickest and most convenient fuel for cooking. It tells of actual savings, in dollars and cents, that GAS—plus up-to-date equipment, can effect. If you haven't received a copy—ask for it NOW.

EQUIPMENT CORP.

Offices: **Baltimore, Chicago, Philadelphia, Boston, Los Angeles and Portland, Ore.**

Selling Modern Gas Ranges

Henry M. Brundage, Jr.

General Sales Manager, Washington Gas Light Co.

SOME abstracts from a paper presented at the New England meeting of sales managers, April 26th by Mr. Brundage in which he brings out some forceful thoughts regarding appliance sales and sales campaigns.

"The greatest stimulation to any sales endeavor is the spirit of competition. This spirit can be fanned into fever heat only by continually feeding it with news of what the other fellow is doing. The sales campaign which does not capitalize on the spirit of individual and collective competition has obviously omitted the baking powder from the recipe.

"You can take four cups of the flour of advertising; one cup of the butter of terms; two cups of the sugar of sales training; one cup of the milk of a fine product; four eggs of a fine market and season; flavor with a generous supply of direct mail and radio—and what have you? Frankly, you have a mess. The only really important ingredient has been omitted—and that is baking powder. You can find a hundred different recipes for a nice cake and one of these elements will be omitted in most of them—but they all have one thing in common and that is baking powder. In much the same way, you can throw together almost every known combination of the usual ingredients for a sales contest but, without the one element of *competition*, you have a *mess*. But put the *competition* into any contest and the result will be quite palatable.

"Of course, there is a theoretical limit as to how far *competition* can go. In Washington, we are just three degrees off a dead center. If this contest doesn't end pretty soon, our entire sales force will wonder if we aren't going mad by degrees. Of course, the company is striving for national recognition. This is *urge* number one.

"We split our city into seven geographical territories, in each of which we place two salesmen. One man takes all the even-numbered houses and the other man takes all the odd-numbered houses. There is bitter rivalry between these two men as you can imagine. This is *urge* number two.

"Now we offer a set of cash prizes for winning teams composed of all the even-numbered men as against all the odd-numbered men. This constitutes *urge* number three.

"Next we select the two highest salesmen in the last campaign and they constitute the Captains of the Derby Racers, or the Stratosphere Flight, or the Steeplechase Jockeys. The highest salesman has first pick of the remaining men to put on his special team. The other Captain chooses a man. Then the first Captain selects another one, and so on until each man has been drawn. The prize in this case will probably be a dinner with all its trimmings to be given by the losing team to the winners at the close of the contest. This constitutes *urge* number four.

"On a suitable score board built around the theme of the contest, each salesman is represented by an aeroplane, racing car, balloon, racing horse or something similar. His daily place in relation to his fellow salesmen makes *urge* number five.

"For the first salesman attaining fifty per cent of his quota, a special cash prize is offered. This is *urge* number six.

"A complete new Easter outfit, consisting of suit, shoes, shirt, tie, hat and underwear is given to every man as soon as he passes his quota —*urge* number seven.

"Additional cash bonuses start accumulating from quota on. Here is *urge* number eight.

"To the three highest men at the end of the campaign is given another cash prize. *Urge* number nine.

"Now the only drawbacks to competition of this sort is the fact that we now find ourselves involved in two divorce proceedings, three alienation of affection suits, four charges of desertion and five cases of pure exhaustion. Outside of these complications, we are progressing quite satisfactorily.

"A successful sales campaign requires much more than a pretty set of cash bonuses. It requires a lot more than a daily dose of sales manager's hot air every morning at eight-thirty. It requires a lot more than a commission check at the end of the month. What it requires more than anything else is *competition*. A salesman can spend his commission check in thirty minutes. He can lose his bonus money in a crap game in fifteen minutes. He can gladly forget the sales manager's hot air in five minutes *b-u-t* he won't sell his satisfaction, trade his confidence or gamble away the thrill of beating his fellow salesmen. The checks and bally-hoo are stale news tomorrow, but the thrill of winning in fair competition is the stuff salesmen thrive upon.

"Before I get very far into the subject of the National Contest, I should like to open the closet door and drag out the old family skeleton. This skeleton has a sign hanging on it which reads *compensation*. Probably I'm treading on dangerous ground and taking an unfair advantage of the fact that most of you did not come armed with baskets of overripe fruit. If you are salesmen, I know you will just love what I am going to say. If you are salesmanagers, you will be interested whether you agree with me or not.

"Now, just for a minute, let us sit back and take a good straight forward look at our industry as a whole. By and large, do you consider the gas industry as representing a particularly strong sales organization? In the industries with which you are familiar, how do you think the gas industry stacks up by comparison with other sales organizations?

"Whether the general public and delegated public servants realize it or not, we, the sales end of our industry, are also the eventual salvation of that industry. And with the tools we are given to work with, there is a tremendous job to be done.

"Many salesmen, also a goodly number of sales supervisors and, unfortunately, a considerable number of sales managers are so "policy minded" that they cease to function as real, live, awake "Go-Getters." Our industry has many problems peculiar to itself and it is terribly easy for the sales department to use the old alibi of "company policy" and "public relations" to excuse their lack of results. In general commercial selling, the sales force which reverted to "free-wheeling" tactics would soon find itself without further use for the old, family alarm clock.

"If there is one thing which industry has learned in the last few years, it is that good men are walking the streets praying for a chance to show that they can deliver the goods, in many cases more efficiently than some of the present incumbents. The organization which has not taken some advantage of this opportunity has certainly missed a wonderful bet.

"Having combed over the best which is available, the most impor-

MAGIC CHEF HEAVY DUTY

Equipment for Modern Gas Cooking

WITH its advanced design and new standards of greater efficiency, convenience and economy, Magic Chef Heavy Duty Automatic Equipment completely fulfills the requirements of modern gas cooking.

Purveyors of food to the public, including hotels, restaurants, cafeterias, lunch rooms, taverns, clubs, hospitals and institutions public and private, will be impressed by its many advanced features.

These features include perfect control of the gas flow provided by the famous Red Wheel Lorain Oven Regulator; extra heavy oven insulation for cooler, more comfortable kitchens; burners with wide range of heats; substantial saving of gas; modern streamline design with easy cleaning and sanitation; continuous cooking tops; more wholesome and delicious food because of more even and controlled heat; automatic lighting; speed, safety, dependability and durability.

Magic Chef Automatic Heavy Duty Equipment materially strengthens the important position of gas for cooking and gives added co-operation and support to the gas industry in its efforts to build and maintain the gas cooking load. An illustrated descriptive folder gives the complete details. If you haven't seen it, write for a copy.

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

BOSTON • NEW YORK • ATLANTA • CLEVELAND • CHICAGO
ST. LOUIS • PHILADELPHIA • SAN FRANCISCO • LOS ANGELES

Magic Chef
AMERICAN STOVE COMPANY

LOOK FOR THE RED WHEEL WHEN YOU BUY A MAGIC CHEF

tant consideration is how to keep this personnel. We have all been talking for years of the low compensation scale of utility salesmen. I have heard many alibis which sound something like—'Well, what can you expect for a hundred dollars a month?' Now, while we are all sort of in the mood to rebuild along the 1935 streamline principle, why not give more than a fleeting glimpse to the compensation item?

"Right here and now, I'd like to prove to you that you get just about what you pay for in the line of quality salesmen. Within the last two years, our company has hired 11 new field salesmen to replace worn-out models. During the last twelve months' period, one man sold 133 ranges and 176 water heaters. Another sold 123 ranges and 170 water heaters. A third sold 184 refrigerators and 72 house-heating units. A fourth sold 142 refrigerators and 84 house-heating units. The average, installed merchandise sales for our salesmen for the last twelve months' period was $32,000 per man. And let me assure you that those are averages only. Here is further proof of what I mean.

"In a recent sixty-day campaign period, the results were:

MAN
No. 1 105 water heaters 19 ranges
No. 2 88 water heaters 12 ranges

In a recent forty-five day campaign period, the results were:

MAN
No. 1 43 House heating 10 refrigerators
No. 2 43 House heating 8 refrigerators
No. 3 40 House heating 9 refrigerators

"I am confident that such results stack up pretty well with sales results of any group of men anywhere.

"There is a good, reasonable answer to how these things are possible. During the year 1934, we had forty per cent less sales personnel than at any time in our company's history. With a force only sixty per cent of what it used to be, our total merchandise sales were 51% ahead of 1933 and equal to the largest year in the company's history. Part of the answer I have already mentioned—*competition*. And the balance of the answer is *compensation*.

"We are firm believers in the principle that the salesman should be allowed to make as much money as he can physically earn. We allow six men to make as much as ten men used to earn. The result is a hard-hitting bunch of quota busters. With a group like this, a quota of one range per day per man for sixty days is just so much 'duck soup.' Our poorest, weakest salesman will bear that quota. The high men will double it. To further prove that this isn't all a lot of 'Washington-hot air,' here are the results for the first half of our campaign—one and three-tenths net, installed sales per man per day *average*. The high men have averaged two net, installed sales per man per day.

"In closing, may I again revert to my original theme and urge that the Sales Departments quit hiding behind the mantle of a New Business Department, which is a convenient way of consciously or unconsciously covering up a lack of aggressiveness, that they shake off the mantle of lethargy, give more than serious consideration to better plans of *competition* and give *compensation* the break that it deserves."

HAYS Double Seals
It's copper to copper with no intermediate sealing agent required.
For a Mechanically Stronger
COPPER Pipe JOINT
Wherever copper pipe goes Hays Double Seals go too. There are over 400 styles and sizes all approved by Underwriters Laboratories. A patented 2 faced pipe flare (45° + 90°) fits over 2 machined seats to make the strongest method of joining copper pipe.
GET THIS BOOK
ASK FOR HAYS
DOUBLE SEALS
HAYS MFG. CO. Erie, Pa.

1935 National Gas Range Sales Contest

H. M. Brundage, Jr.

Chairman, Domestic Range Committee
American Gas Association

IT won't be long now before Uncle Sam will be delivering sixty-six checks totalling $9,000—eighteen beautifully embossed certificates—and two hundred and eighty-two bronze lapel buttons, all in recognition of the greatest four months gas range sales activity this country has ever known.

While the original goal was 500,000 Gas Ranges in four months, each company participating selected only a two months selling period—so that, in effect, the plan was to sell 500,000 Gas Ranges in a two month period.

That, in itself, was an ambitious program representing an increase of 66 2/3% over the same period last year. But more than that, the pressure was put on only completely equipped ranges in an effort to grade up the appliances sold by all the contestants.

Present indications are that the contest is not only producing all the possible results we might have hoped for, but is in many ways exceeding our fondest expectations and it is not at all improbable that final reports will indicate combined sales of at least five hundred thousand (500,000) ranges.

The plan of dividing the $9,000 in cash, plus the other substantial awards, has been turned over to a Committee composed of Major Alexander Forward, Managing Director of the American Gas Association, Mr. F. M. Rosenkrans, Chairman of the Commercial Section and

Mr. Allan Tappan, Vice President of the Tappan Stove Company, in whose hands will rest the entire distribution of prizes and awards, and final reports are being turned over to this Committee as rapidly as they are received.

I have received a great number of letters from all over the country, outlining in general their plan of procedure and partial success at the time of writing and I am struck by the number of "dark horses" which we have in our midst. There seems to be no doubt that the winning companies in all six divisions will, individually, have done outstanding jobs, in most cases far in excess of any previous campaigns.

It looks as though utilities sales, plus dealers' sales, will amount to 3% to 5% of the domestic meters in most of the divisions. Considering that these reports cover only a two month period, it is fair to assume that these winning companies will continue extensive activity on range sales and will sell at least 10% of their domestic meters this year.

The one thing that has made this National Contest "sure fire" is the COMPETITION which it has offered. There is little to any contest which has substantial basis except competition. If this is true on a national scale it is even more true on a local scale and the company or division which comes out on top will be that company which has felt the competitive urge and will gain the greatest amount of personal satisfaction when the job is finished.

There are two hundred and eighty-two (282) Gas Utilities who have learned during the past few months many lessons individually and collectively. Most of these companies have found out for the first time that their local dealers are not the antagonistic individuals many of them were supposed to be, but are honest, sincere business men anxious to cooperate and possessing many merchandising attributes which we would do well to follow, and who only need the leadership which the local utility can and should naturally give to put the Modern Gas Range in the spotlight of their current activity.

Many companies have learned that better gas ranges can be sold, and in substantial quantities, by playing up the modernness of the 1935 Gas Range. A substantial contribution to this theme was the introduction of the teaser ads which were included in the sales material originally sent out by the Range Committee and which are or have been used by more than 20% of the Industry in connection with their local campaigns. A whole story could be written on the advertising value of the slogan "I'm Buying a Modern Gas Range." The fact that it clicked so spontaneously indicates that our Industry, as a whole, is alive to the appeal.

Our Contest closes on June 30 and each contesting company has ten days after the close of their individual campaigns in which to complete the installation of orders taken during their contest period. We, therefore, expect that the last reports will be in our hands shortly after the 10th of July and some time between the 15th and 20th, our Awards Committee will break the great news and our Industry can congratulate itself upon having done a great job.

AMERICAN GAS ASSOCIATION

RANGE SALES CONTEST AWARD

This is to Certify that First Prize has been conferred upon

The National Gas Company, Murdoch, Va.

for outstanding achievement in the sale of modern gas ranges during the 1935 National Contest conducted by the Association.

Gas vs. Electricity For Hotel Cooking

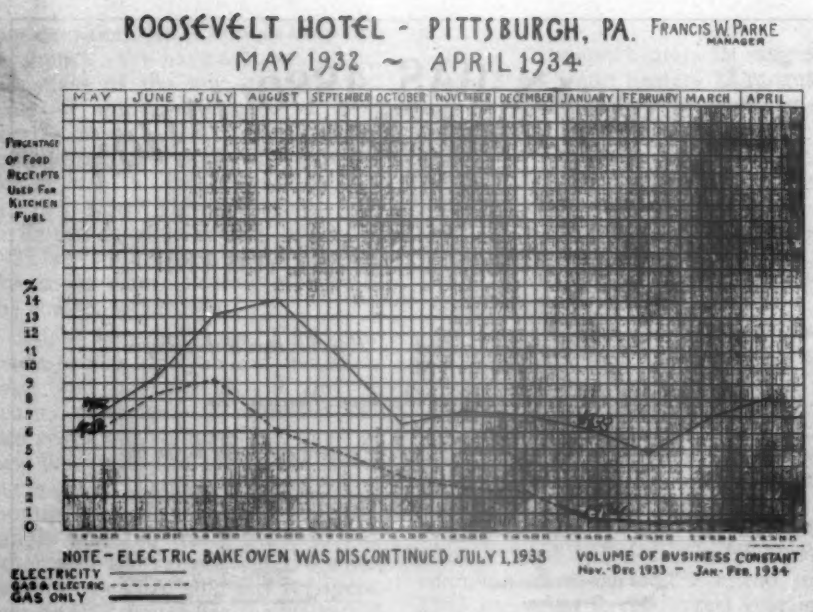
MODERN hotel and restaurant gas cooking equipment has been improved in many ways during the past three years. In this day of fuel competition for cooking, a few outstanding examples of savings to be made by the installation of the modern gas cooking equipment is of importance.

The up to date hotel and restaurant cooking equipment has been modernized in many respects. It is now more efficient, more economical in many ways than the old heavy cooking equipment. During the past few years, many hotels have replaced their cooking equipment with the present modern equipment. The modern hotel range is insulated, heat thermostatically controlled which not only makes for more ease and accuracy in the preparation of food, but does it more economically.

A Few Records

The Parker House, Boston, Mass., has this to say: "We find that the new equipment has effected a full saving in excess of 25% over the equipment formerly used, and our chef is warm in his praise for these modern cooking devices."

Again, the Hotel Savory, Kansas City, Mo., installed new gas fired hotel ranges in January, 1933. Note the savings in consumption of gas from February to July, 1933:


ROOSEVELT HOTEL - PITTSBURGH, PA. FRANCIS W. PARKE MANAGER
MAY 1932 ~ APRIL 1934
MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY FEBRUARY MARCH APRIL
PERCENTAGE OF FOOD RECEIPTS USED FOR KITCHEN FUEL
%
NOTE - ELECTRIC BAKE OVEN WAS DISCONTINUED JULY 1, 1933
VOLUME OF BUSINESS CONSTANT
Nov.-Dec. 1933 - Jan.-Feb. 1934
ELECTRICITY
GAS & ELECTRIC
GAS ONLY

Month	Consumption 1932	Consumption 1933	Savings
February	156 6	93.4	40%
March	148.8	54.0	64%
April	141.0	67.8	52%
May	151.6	67.8	55%
June	116.0	70.0	39%
July	95.4	81.8	14%
		Average Saving	46%

The Hotel Utica, Utica, N. Y., in June, 1933 discarded all old gas ranges and installed the new heat controlled insulated ranges. Note the daily meter readings for the first week in June and compare with the first week after new ranges were installed:

Old Ranges

June 1	9,600	cu. ft.
" 2	10.800	cu. ft.
" 3	11,700	cu. ft.
" 4	10,000	cu. ft.
" 5	9,300	cu. ft.
" 6	12,300	cu. ft.
" 7	10,900	cu. ft.

New Ranges

June 19	4,800	cu. ft.
" 20	4,100	cu. ft.
" 21	3,500	cu. ft.
" 22	4,900	cu. ft.
" 23	3,000	cu. ft.
" 24	5,000	cu. ft.
" 25	3,900	cu. ft.

A saving of over 50% in fuel costs.

Gas vs. Electricity

The Hotel Roosevelt, Pittsburgh, Pa., used both gas and electricity for cooking. In December, 1933 they went to all gas fired equipment. The chart tells the story of savings in full. In November and December, 1933 they used both gas and electricity. January and February all gas. They state: "The business for these four months was absolutely constant and indicates that we reduced our fuel costs to one-third of their former costs." "The savings paid for the new equipment in three months."

Replacing Oil Equipment

McBride's Inc., a restaurant in Cambridge, Mass., wrote the Cambridge Gas Light Company, April 12, 1934 as follows: "Because of the numerous interruptions to our service, due to faulty operation of our oil burning ranges, we installed a modern gas-fired restaurant unit with insulated oven and automatic heat control. We are pleased to report that our operating difficulties have been eliminated."

Gas vs. Coal

The Copley Plaza Restaurant, Washington, D. C., in April, 1934 replaced gas ranges for coal ranges.

Working Conditions Will Improve. Nothing Handicaps a Good Chef More Than Unsatisfactory Equipment.

C. G. Aben, Proprietor, wrote on July 30, 1934: "Our cost of gas over these three months shows a saving of 42% below coal costs." Many more examples of fuel savings could be given. The cases quoted above include electricity, oil and coal as fuels. Replacements with the modern hotel range effected big fuel savings in every case.

There Will Be Less Waste. Many Chefs Find They Can Do Their Work with Fewer Units.

Time Saved for Cooking Crew

A. G. A. Annual Convention to Be Held in Chicago Instead of Atlantic City in October

At a meeting of the Executive Committee of the American Gas Association, held in Atlantic City, N. J., May 31st, it was decided to hold the 1935 Annual Convention at Chicago, Ill., about the week of October 14th instead of Atlantic City as was announced last November.

A home in which actual field tests were made on an automatically fired steam plant. This is one of many homes located in various parts of the country so that tests could be conducted under all kinds of climatic and weather conditions and using various types of automatic heating equipment.

■

Years of Tests Prove the . . .

ACRATHERM

19 Thermocouples in these locations check the Acratherm:

Boiler or Furnace Temperature
Stack temperature
Ahead of back draft diverter
Behind back draft diverter
Two Radiators or Registers
Ceiling line temperature
Breathing line temperature
Thirty-inch level
One-foot level
Floor line temperature
Basement temperature
Remote room temperature
Outside temperature
Solar Radiation
Inside wall—sunny side
Outside wall—sunny side
Inside wall—shady side
Outside wall—shady side

Brown Indicating Potentiometer, equipped with selector switch, (above) and **Brown Recording Potentiometer** (right), actuated by thermocouples, the most sensitive and accurate means of measuring temperature. These instruments indicated and recorded the temperatures at the various points in the homes where tests were made.

■

ACTUAL field tests and laboratory research conducted over a period of years, definitely and conclusively prove the advantages of the Heat Acceleration principle and the new Minneapolis-Honeywell Acratherm. Through use of thermocouples, the most accurate and sensitive means of measuring temperatures, and Brown indicating and recording potentiometers, exhaustive tests were made with various kinds of thermostats under all conditions. The results conclusively proved the superiority of the Minneapolis-Honeywell Acratherm and the Heat Acceleration Principle . . . . Minneapolis-Honeywell Regulator Company, 408 East Twenty-Eighth Street, Minneapolis, Minnesota.

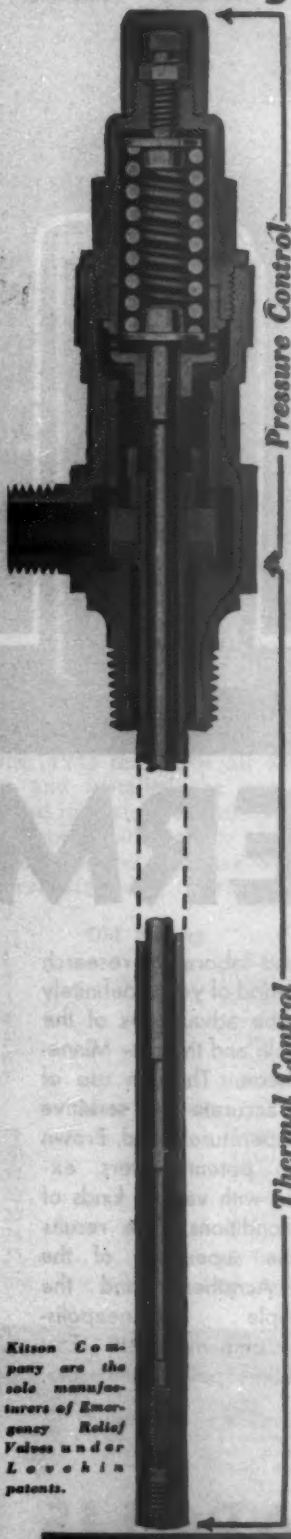
Branch and distributing offices in all principal cities. In Canada: Minneapolis-Honeywell Regulator Co., Ltd., 117 Peter Street, Toronto. European sales and service: 233 Heerengracht, Amsterdam, Holland.

MINNEAPOLIS HONEYWELL

Control Systems

BROWN INSTRUMENTS FOR INDICATING AND RECORDING

"Real Emergency Relief"



PREVENTS

Excessive Temperatures as well as danger from Water Expansion Pressures

Why is Temperature Relief necessary?

No so-called pressure relief valve can prevent the generation of steam in a water heater, under all operating conditions. In a closed system, pressure relief is necessary to provide for the natural increase in the volume of water when heating, but this pressure relief is not in itself sufficient to prevent serious trouble, should the water temperature continue to rise.

To be absolutely sure, it is necessary to prevent the temperature of the water reaching a point where (at the pressure within the tank) steam can be generated. Under certain conditions, this can happen even with so-called pressure relief.

In principle and in design the Lovekin temperature controlled valve operates unfailingly when the temperature condition becomes dangerous, no matter what the pressure conditions might be.

Send for Literature describing our Complete Line of Safety Devices for Domestic Water Heaters

Kitson also manufactures Ground Key Stops for Gas and Water — and Brass Plumbing Products.

Kitson Company are the sole manufacturers of Emergency Relief Valves under Lovekin patents.

KITSON COMPANY
261 No. BROAD ST.
PHILADELPHIA PA.

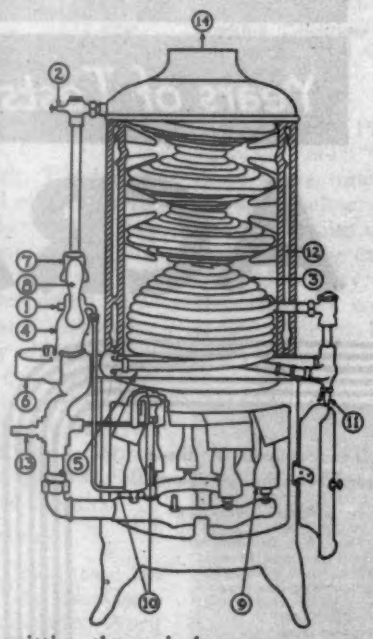
"Established 1897"

Domestic Gas Utilization

(Continued from page 14)

radiation loss of the larger storage heater required to supply comparable hot water service. Engineers have a way of describing the situation by stating that, assuming the available storage plus recovery is adequate to meet peak demands, the improvement in the load factor (ratio of burner standby time) tends toward an increased overall economy with the slow recovery heater. The consensus of opinion is with those companies having extensively used the slow recovery type that definite economies have been gained and hence greater customer-satisfaction provided discretion was employed in the selection of size.

The *AUTOMATIC INSTANTANEOUS HEATER* is so designed that a sufficiently large volume of gas is burned under the copper coils to heat up to some predetermined maximum temperature the water as the same travels through the coils directly to the hot water pipes. Turning on the faucet causes a drop in water pressure across the primary control valve which in turn automatically allows flow of the main gas supply to the burners. Ignition is effected by a constant burning pilot light, the heat from which is necessary to keep the safety shut-off valve in the main gas supply open.



Instantaneous Automatic Gas Water Heater

The gas inlet is at (4) in the rear. The pilot light (10) gas tube bypasses the water-gas valve (6) and the safety gas shut-off (13), through which two valves the main gas supply travels to the burners (9). The manual gas cock is at (8).

Cold water is admitted at (7) and hot water discharged at (1). The turning on of a hot water faucet causes enough drop in pressure across (6) to open, thereby permitting the main burners to come on and water to enter the helical coils at (2). The flow of water may be increased or retarded by the valve (2).

Water passing through the copper coils (3) absorbs sufficient heat to raise to the proper temperature. At point (5) is located an internal temperature regulating thermostat. Drain cock (11) is to facilitate cleaning of the water coils.

The hot gases pass up around the coils and to the down-draft diverter chimney connection at (14). The coils are surrounded by a dead air insulating chamber (12) and an iron outer shell jacket.

Gas inputs range from 87,000 Btu. per hr. to 350,000, depending upon the number of gal. water flow per min. specified (2.5 to 8 g.p.m. at 60° F. rise.) From a distribution standpoint, gas demands of this character and magnitude tend to bring about pressure difficulties in both the service line and the mains. Large

size meters are obligatory. Due to higher thermal content natural gas systems do not experience pressure difficulties from this cause to the extent encountered with manufactured gas.

The elimination of hot water storage or reservoir with this type of heater dispenses with the tank standby loss incident to all other types of automatic heaters. However, tending to counter-balance this apparent saving there is the loss of the heat contained in the water in the copper coil, in the metal of the coil itself and in the combustion chamber after the closing off of the burner. The tendency of these elements to cool is made rapid by being directly in the natural air draft caused by the chimney. As a very rough approximation (assuming 40 ft. of ½ copper pipe plus allowance for other materials and an 80° F. rise and a 75% heater efficiency), it is estimated that 1.7 cu. ft. of 525 Btu. gas is required to overcome the heat lost in each complete cooling of the heater back to room temperature. The loss of heat is not rapid enough probably to allow the heater to drop to room temperature each time the faucet is turned off. Nevertheless, assuming that in the average home the water faucet is turned on an average of sixty times each day, the heat loss from this source approaches, if not exceeds, the standby loss of the normal domestic storage heater.

Perhaps the most difficult inherent design problem in perfecting the automatic instantaneous type has been in making the water-gas valve sufficiently sensitive to permit the closing of a faucet to immediately turn off the entire gas supply to the main burners. If this element of time lag after closing the faucet is appreciable a considerable amount of gas is burned for no good purpose, a circumstance of particular importance because of the high rate of gas input.

The lack of flexibility of this type of heater introduces certain definite restrictions. Each size heater having some designed rating for maximum Btu. input, the maximum rate of water flow is fixed at any one time to supply a given number of hot water faucets, usually one or two. If any more than this prescribed number of water faucets are in use simultaneously a lowering of discharge water temperature results. If less than the prescribed number of faucets are in use a lowering in efficiency results. In a like manner fluctuations in inlet temperature introduces another variable factor.

The foregoing gives an inkling into the reasons in back of why the trend has been toward the use of the storage type. In addition to these several factors mitigating against the instantaneous type it should be observed that: 1.) the initial cost is high, 2.) a more complicated mechanism means increased service costs, 3.) replacement of heating coils due to burning out or clogging is expensive, 4.) relighting of pilot light with such large volumes of gas in the combustion chamber is dangerous to inexperienced operators.

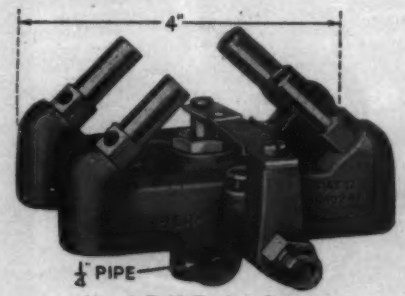
Despite all of the above it is generally recognized that for certain special applications the instantaneous has no superior and perhaps no equal. Consider for a moment churches and certain types of commercial establishments. such as barber shops, beauty parlors, restaurants and other places where the water load is quite intermittent and where rather large amounts are used when required, or, in other words, applications where the faucets are not used frequently but where relatively large volumes of water are withdrawn each time that service is used. Here the absence of standby

BARBER'S NEW REVISED PRICE SHEET

SHOWING REDUCTIONS UPON
BARBER BURNER UNITS
BURNER AND PILOT JETS
GAS VALVES AND FITTINGS
GAS PRESSURE REGULATORS

Will Stimulate Appliance Sales

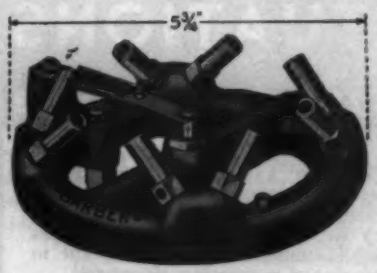
These Net prices, after discount, of the New Patented Barber Units with Safety Pilots are no higher than those of good Safety Pilots alone—and remember Hot Water Heaters must be equipped with Safety Pilots after July 1st, if A.G.A. Testing Laboratory Approval Requirements are observed.



No. A.P-10 Barber Burner

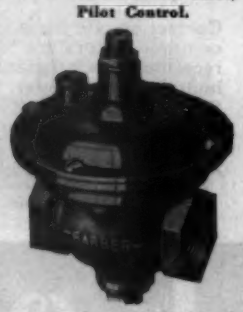
There are over 40 different Standard Models and Sizes of Barber Burner Units, with Safety Pilot Control, of various capacities and 54 without Safety Control. There surely is a specific type for your appliance.

No. P.U.-80 Barber Burner



No. S.P.-15 Barber Burner

No Gas Appliance is better than its Burner — and without the proper Burner no Appliance stands present day rigid tests. That's why leading Manufacturers have adopted Barber Burners with Safety Pilot Control.



Gas Pressure Regulator

Large users of Gas Pressure Regulators have switched to BARBER, after making comparative laboratory pressure drop tests and being convinced that no other make will show as low pressure drop. Their precise machining, assembly, bronze bodies, compactness, and their attractive prices are appealing.

Write today for these New Revised Prices and Discounts. Let us have your Gas Burner problems so that we may aid you in creating satisfied customers.

THE BARBER GAS BURNER CO.
3704 Superior Ave. Cleveland, Ohio

the ACCURACY of Connersville Meters

. . . . . is not disturbed by WIDE FLUCTUATIONS in pressure and volume

The rate of flow for gas passing through a Connersville Meter may vary from 10% to 150% of the normal rating of the meter without affecting the accuracy with which the volume of gas is measured. Displacement is always constant in the accurately machined measuring chambers.

Corrections for variations in pressure, temperature, or other factors are readily made by means of the recording or integrating instruments that can be built into the meter to meet specific conditions. Sizes and types of Connersville Meters are available for capacities ranging from 1000 to 2,000,000 cu. ft. per hour, and peak line pressures from 25 lbs. to 300 lbs. or higher.

Write for bulletin 40-B10

Roots CONNERSVILLE BLOWER CORP.

CONNERSVILLE, INDIANA

NEW YORK • CHICAGO • POTTSTOWN, PA. • SAN FRANCISCO
PITTSBURGH • BOSTON • DETROIT • ST. LOUIS • LOS ANGELES

loss and the few number of "tailend" losses stand the instantaneous in good stead.*

An automatic instantaneous heater has been introduced recently with an electric pilot light with the object in mind of eliminating the expense of a constant burning gas pilot which has a relatively large consumption in the instantaneous type to secure proper ignition of the high gas input.

A well bracket type of automatic instantaneous heater has just been placed on the market having several desirable features. Facilities for the placing of this heater on a wall close to the point of use eliminates the usual long runs of hot water lines. The design is such as to permit preheating of the incoming secondary air with heat that otherwise would be partially lost when the main gas supply is on.

In addition to the four general types of automatic gas-fired water heaters illustrated and discussed in the foregoing, there are other types of heaters in use in the American market too numerous to any more than mention briefly here as follows:

a. The Cottage Heater is of a manually operated, continuous flow type, placed immediately above the point of use. Homes without benefit of hot water piping can employ this type which is surprisingly common in England and certain European countries. Although considered out of date by many, there is reason to presume that a return to popularity is probable in order to reach a limited and specialized market.

b. The Pilot Tank Heater is a regular tank heater, hooked up usually to an insulated tank, the burner having an inner ring of ports lit constantly and sufficient heat input to overcome slightly less than the standby losses. Full gas input is obtained manually usually by a pull chain for upstairs control. Expensive operation except on natural gas.

c. The Side-Arm Storage Heater is in principle an ordinary tank heater hooked up with an insulated tank with the necessary accessories to make operation automatic. Obsolete in its older designs. The cooling of the water in the copper coils of the heating unit with the natural draft induced around these coils produces a circulation of water from the top of the tank through the coils and hence, to the bottom, thereby resulting in surprisingly high operating costs due to high standby loss. A manufacturer is reported to be going into production on a heater providing a separate combustion chamber under the tank designed in such a manner so that the water circulated through the heat exchanger is effectively trapped by water pipes to prevent the internal water circulation during standby periods. This new heater eliminates the design objections to the old side-arm type and retains the advantages of combustion taking place apart from the tank and through an outside flue, thereby minimizing tank replacements.

d. The U-Tube Automatic Storage Heater is constructed with a bent (180° F. angle), internally-fired flue pipe discharging the products of combus-

**It is significant to note in the "Final Report of Comparative Water Heater Tests" conducted by Massachusetts Institute of Technology at the behest of the Am. Gas Assoc. that the instantaneous type made a creditable showing. However, the draw-off schedule (pg. 19) indicates that the maximum number of withdrawals in the 50 gal. per day test totalled only ten which is far removed from ordinary home conditions. The method of conducting these tests, it would appear, did not exact the full penalty of the elapse in time between the closing of the faucet and in final extinguishment of the gas at the main burner which is a condition frequently occurring in most American homes.*

tion downward at the base. This is normally of the slow recovery type and excellent results have been achieved with this heater which is widely sold in some areas.

e. Heat Input Controlled by Customer is a variety of the automatic storage type which permits the customer to change from a slow recovery to a quick recovery, or vice versa at will. This heater is suited especially to homes desiring the economy of the slow recovery type during the majority of the time but demanding the availability of a quick recovery to meet abnormal requirements such as heavy Monday washes or a number of temporary guests. Fine if customer manipulates according to instructions.

f. The Automatic Tank Heater has become, due to recent improvements, a factor in the water heater business as a substitute for the conventional automatic storage type. The automatic tank heater is a device which installed on to an existing tank (ange boiler or "what have you") converts the former facilities into an automatic gas-fired system. In jobs of this character the tank is, or at least should be, insulated by wrapping in a specially prepared heat resisting jacket. Overall efficiencies with the better of the new heaters approaches that of the regular automatic storage type, in fact, exceeds the efficiency of many now on the market. The automatic tank heater has the distinct advantage of a lower first cost, the total installed cost approximating 65% of the regular type. However, the word "substitute" may be used advisedly because the customer still has a used tank, the heat loss from which is more subject to the human equation, insofar as the application of the insulating jacket is concerned. In territories where copper tanks are necessary the automatic tank heater gives promise of solving a heretofore knotty problem.

g. Automatic Storage with Positive Air Control promises to represent a substantial stride forward in fundamentals. The basic idea is to cut out the main air circulation through the heater when the burner has been thermostatically turned off. Initial tests on this most recently developed type of heater indicate gains of from 8% to 16% efficiency increases at normal water withdrawals as compared to the best of the conventional storage heaters without such air-dampering devices, other things being equal. The greatest efficiency gains are to be expected at low monthly water withdrawals because the more prolonged standby periods. It is probable that ensuing years will find this new development or something achieving the same basic result, becoming generally accepted.

h. For extremely large hot water volume requirements (estates, apartment houses or commercial jobs) the following gas designed automatic types attached to large storage facilities can be used but these are cases for the "heavy thinkers:" *

1. The Multi-Coil Heater is generally similar in construction to the automatic instantaneous, except being operated by a "all-on" thermostat inserted in a tank instead of by a water-pressure valve.
2. The Boiler Heater is a regular boiler which either circulates the water through its sections for direct heating or is a steam boiler with a "heat exchanger" or immersed steam tubes in the storage tank proper.

** Industrial Gas Series/Water Heating/ Am. Gas Assoc. is devoted primarily to large volume installations.*

from the Records !

Over a period of years—ten, twenty, forty, or more years under all kinds of conditions, a real survey gives the facts on Regulator performance. Reynolds Engineering Department has investigated one after another of their installations that have been in use for periods extending up to forty years. In all cases the check-up has reflected credit on the Reynolds Engineering Department and in every case a satisfied user was of even greater importance to Reynolds.

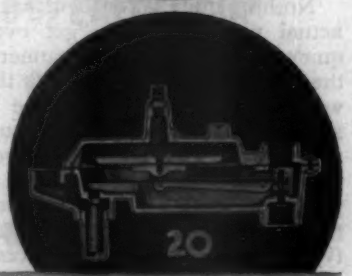
This check-up by Reynolds verified the dependability of their units with actual facts from the field and gave additional verification of shop tests, proving the superiority of Reynolds Regulators.

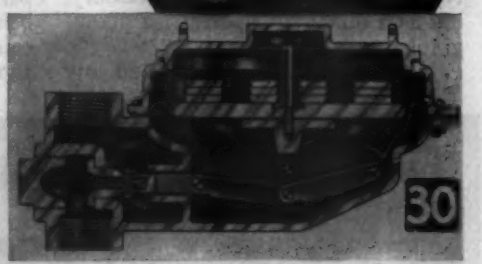
Model 10—all parts accessible and interchangeable while in pipe line.

Model 20—working parts so accurate as to permit complete interchangeability in shop.

Model 30—has removable valve and orifice, and is made in either horizontal or vertical connections.

All three models manufactured in either spring or dead weight adjustment and with or without mercury seal.





Reynolds Branch Offices:
421 Dwight Building
Kansas City, Missouri
2nd Unit, Santa Fe Building
Dallas, Texas

Representatives:
Eastern Appliance Co.,
Boston, Massachusetts
F. E. Newberry
Avon, New Jersey
G. H. Unekefer
428 Boyd St., Los Angeles

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

Illustrate An Occasional Window Display Idea with Photographs

by Stuart Bratesman

AS a "break" from your regular type of painted poster window display, try an occasional set-up with a group of enlarged photographs to pictorially explain certain points you wish to stress about the subject advertised. By this, we do not necessarily mean to feature these pictures over the headline copy, but to use them to further explain a series of thoughts.

As an example, study the three window displays reproduced with these lines. In none of them do the photographs predominate, yet each set is worked into the design as explanatory matter after the "flash" has been read.

Nothing quite takes the place of an actual photograph to "get over" a quick thought in this manner. In the display with the race horse theme, we could have painted in the areas showing the various features of the modern gas range, but the results would never tell the story as completely as the photographic illustrations. In some cases, the painted type of poster flash is most necessary, but as a quick "mopper-up" a photograph is most effective.

If you will notice the ads in any national magazine you will see that many have small pictures, neatly arranged in groups, running down one side of the layout. This treatment drives home as many as six extra thoughts, after the body copy has been read, or as a person skims through the magazine. In the gas company window, this pictorial summing up still retains much of its original effectiveness due to the size of the enlargements.

When handled correctly, this small photographic treatment of supplementary subjects adds much to the completeness of a successful window display advertisement.

In the spring theme display, hidden lights played up these photo panels, while the race horse photographs had indirect lighting behind each picture which created a glow of light around the edges. The gas flame in the educational set was painted in transparent water color paints on cloth and illuminated from behind. This method of lighting centered the interest where the designer desired and presented the symbol of the industry in a striking manner.

Due to the extra cost of these photographic enlargements, these three displays cost a bit more than the usual type of poster piece. Their added effectiveness, however, more than made up for this figure. Tempera cold water paints were used to paint the panels, which were braced from behind with light pine frames. To facilitate quick and efficient transportation, these displays are made on one piece, where it is possible. There is a new brand of water color paint just placed on the market that the writer will be more than pleased to recommend to any interested reader. This paint is absolutely non-fading, waterproof, brilliant and smooth. It costs less than the regular tempera paints, and is not an oil paint, japan or lacquer, which makes it all the more remarkable.

Try some of these photographic illustrations in one of your next window displays. We'll guarantee it will create interest and pay for itself in a few short weeks.

140 CHECKS FOR APRIL! 140 CHECKS FOR MAY!

140 *more* CHECKS ARE WAITING FOR *June* WINNERS

IN THE "PROSPERITY CUP CONTEST" *FOR* REFRIGERATOR SALES!

AND DON'T FORGET . . . 63 Grand Awards are still to be made! Awards of $100, $90, $80, $70, $60, $50, $40, $30 and $20 in each division. BE SURE THAT YOUR COMPANY'S REPORTS ARE IN ON TIME! If you need additional blanks, write or wire to J. W. West, 420 Lexington Avenue, New York City.

REFRIGERATION COMMITTEE, AMERICAN GAS ASSOCIATION

Gas Pressure Controls

(Continued from page 17)

but sections where pipes enter and leave the structure are omitted. When the lines are grouted or concreted in they are practically anchored in the wall or floor. The omission of a section of the structure provides the advantages mentioned for casings during erection of the regulator and if the concrete is properly worked in around the pipe when poured a water tight joint will be secured. This method in some cases increases the rate of corrosion on the section of the pipe immediately adjacent to the wall or floor but the rate of corrosion at these points can be minimized by proper water proofing or painting followed by careful maintenance. Changes in the pipes would require breaking out of the masonry but the infrequency of such an occurrence and the lack of knowledge as to future sizes detracts from the disadvantage. The most important advantage of anchoring is the elimination of strains originating after construction external to the pit or structure being carried into the line regulator or any of its auxiliary equipment. To secure this advantage the anchorage must be as firm as possible and is usually not secured when the walls or floor are of brick, hollow tile or similar masonry. An anchorage prevents any angular, transverse or lateral movement of pipe being carried into the fittings where it might cause rupture particularly of cast iron parts.

Rules and Regulations Pertaining to the Inspection and Maintenance of Gas Holders

(Continued from page 19)

tensive maintenance or construction work on holders, valves and pipe connections, shall be done in accordance with the latest procedure recommended by the American Gas Association Committee and accepted by the American Gas Association. As of this date the accepted procedure is dated March 15, 1933.

This same procedure shall be followed before the holder under repair is restored to service.

20. Supplementary Inspection — All Holders

At least once a year an inspection shall be made of all holders by competent independent inspectors or engineers not in the employ of the company. The inspectors or engineers shall submit complete reports to the responsible operating official.

21. General Safety Provisions

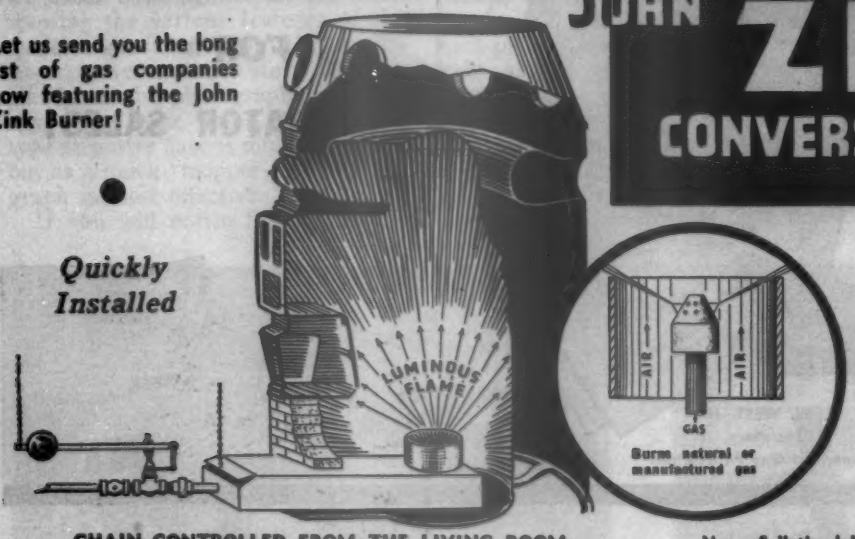
Smoking, open flames or devices that might ignite an explosive mixture shall not be permitted in the immediate vicinity of the holder.

During the progress of minor construction or maintenance work on holders, all customary safety rules prevailing in the plant, as well as those hereinbefore described, shall be rigidly adhered to. On work of the foregoing nature, experienced men shall be employed under direct and competent supervision and all crews shall consist of at least two men.

All procedures recommended by the American Gas Association for the purging, operation and maintenance of gas works equipment and apparatus, including mains, are to be followed.

MULTIPLY YOUR HOME HEATING PROSPECTS WITH THE NEW JOHN ZINK CONVERSION BURNER

Let us send you the long list of gas companies now featuring the John Zink Burner!



Quickly Installed

The new John Zink Burner gives the Gas Industry its long-awaited answer to the question, "How shall we sell Gas Heat to the small-home owner and the renter?" Look at our price to Gas Company Dealers:

Burner	$8.50
Chain Control Accessories	4.00
Baltimore Automatic Cut-Off	8.50
	$21.00

(Thermostatic Equipment Extra)

CHAIN-CONTROLLED FROM THE LIVING ROOM OR FULLY AUTOMATIC WITH CUSTOMARY CONTROLS

Furnished Complete At A

SENSATIONALLY LOW PRICE

Now—Sell the John Zink Burner at cost—at a small profit—or install it as you do your meters, and BUILD LOAD! Let us show you—write to:

JOHN ZINK BURNERS
TULSA, OKLAHOMA

Development of Analytical Methods for the Determination of Nitric Oxide in Gas

(Continued from page 30)

is used to remove any traces of hydrogen sulphide is followed by caustic pellets which will remove the moisture to a point where it is not likely to be deposited in the reaction bottle.

Experience indicated that the absorption tower should be maintained at a temperature between 85-95° F. (30-35° C.) in order to prevent the absorption of some unknown constituent which discolored the Griess solution.

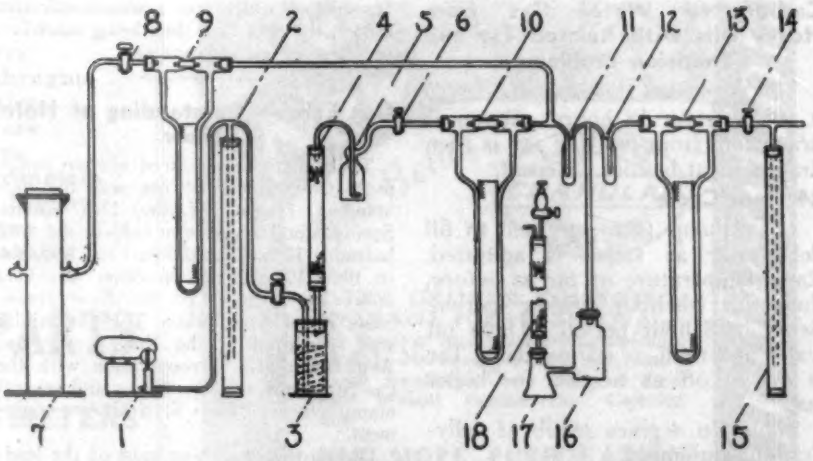
Present Test Apparatus

Figure 3 shows the flow sheet of the latest modification of our spot testing apparatus and Figures 4 and 5 are front and back views respectively. The flow sheet shows the use of the maleic anhydride scrubber and indicates the small holder and flow meter used for adding the commercial butylene which acts as a catalyst.

The pump has been provided with self-starting motor to prevent the difficulty due to momentary cessation of the electric supply. The automatic temperature control and absorbing tower is also shown in the front view.

The design of the recorders has been somewhat simplified, the most important change being the use of an automatic syphon feed for the Griess solution so that a sufficient amount of solution is added at intervals of about 8-12 minutes, so that the whole cross-section of the column is filled with a descending stream of reagent, thus insuring a wetting of all of the beads, preventing the colored dye collecting in the column, and insuring better absorption of the NO_2.

Cooperation with the manufacturers of the light sensitive cells has resulted in securing much more sensitive cells than those at first supplied.



Apparatus for the Determination of Nitric Oxide in Carburetted Water Gas and Oil Gas.

Because public demand for Cleaner Domestic Fuel has increased by leaps and bounds—

DUSTLESS COKE SELLS FASTER!

COAL KOTE

Coalkote is Non-Corrosive Permanent Inexpensive and Practically Odorless

Many leading coke producers are now using Coalkote. For samples and full information address

SUN OIL CO., 1608 Walnut St., Philadelphia, Pa.

Available in grades for freezing and non-freezing temperatures

Affords Easy and Economical Dust Control

Carburetted Water Gas from Heavy Oils with Related Tar and Emulsion Problems

(Continued from page 34)

it to settle for 18 hours. Water is drawn off from top and tar is then drawn off at bottom. Repeat.

24 Hour Cycle

(2) "Pump from tar well to fill dehydrator as steam is admitted. Raise temperature of tar as before, during a 14 hour heating period. Settle in 8 hour period. Draw off water and refill, repeating cycle. Tar is drawn off as needed for boiler fuel."

Table No. 4 gives details of dehydration equipment.

Table No. 5 gives the emulsion and tar analyses.

Summary

The operating cycles are somewhat similar with the exception of differences in amounts of blow run and blast purge. This is due probably to differences in gas gravities and amounts of reforming.

The methods of dehydration of the emulsion are quite different and are as follows:

(1) Batch method in tanks sometimes augmented by stills.

(2) Continuous tank operation, also augmented by stills.

(3) Straight still operation.

(4) Pressure Flash dehydration.

(5) Spraying or pumping through restricted orifices.

It is unfortunate that more plants do not measure the steam used for dehydration as a comparison of the actual cost by these various methods would be very interesting.

All of the plants agree that the dehydration difficulties occur while reforming. However, there seems to be a difference of opinion as to the actual stabilizing agent.

Vermont Gas Superintendent is Elected Mayor of Montpelier by Unanimous Vote

James F. Ewing, superintendent of distribution for the Capital City Gas Company, was elected mayor of the City of Montpelier on March 5. The election took place without opposition, which is quite unusual for a candidate running for the first time. Prior to the election, Mayor Ewing had served two years as alderman on the city council and, during 1934, was president of the board.

Election to the city's highest office climaxes for Mr. Ewing a long and successful period of service with the gas company. He joined the Capital City Gas Company in June, 1912, and since that time has formed a large acquaintance in the city, which helped greatly with his candidacy for office on the council.

To Mayor Ewing also goes the credit for installing the first Electrolux in Montpelier, which was a seven-cubic-foot model, the only type then being manufactured, some eight years ago.

Gas Exhibit Outstanding at Hotel Show

The exhibit of gas fired kitchen equipment for commercial use was the outstanding feature of the 17th Annual Spring Hotel Exposition held in the Ambassador Hotel in Atlantic City, May 6th to 10th, 1935. The exposition was held under the auspices of the New Jersey State Hotel Association. The gas exhibit was sponsored by the New Jersey Gas Association and in cooperation with the gas companies of New Jersey and several manufacturers of gas fired kitchen equipment.

During the exposition most of the leading hotel and restaurant owners in New Jersey, and many from neighboring states, visited the gas exhibit. Attendants at the booths were impressed by the interest shown on the part of many of them in the modern thermostatically controlled and insulated equipment. Many users of this modern equipment volunteered the information that they were well satisfied with their installations and enthusiastically recommended gas company service to their friends.

The following manufacturers cooperated with the New Jersey Gas Association and displayed their equipment:

American Stove Company
Standard Gas Equipment Corporation
Detroit-Michigan Stove Company
Savory, Inc.
Yarnall-Waring Company
Rue Manufacturing Company
The G. S. Blodgett Company

The Atlantic City Gas Company also had space in the Association exhibit.

The background for the exhibit was furnished by the Display Department of the Public Service Electric and Gas Company.

The appliances on exhibit included insulated, oven heat controlled heavy duty ranges; automatic gas toasters; automatically controlled coffee urns and steam tables; insulated heat controlled bake ovens and the new top controlled hotel range.

Seven sections of range and two deep fat fryers were sold during the show and thirty-seven prospects were secured for additional equipment.

The following gas companies had representatives at the show: County Gas Company, Atlantic City Gas Company, Jersey Central Power & Light Company and the Public Service Electric and Gas Company.

Both manufacturers and gas company representatives are urging that the New Jersey Gas Association make this an annual activity.

Change of Address

T. A. Canty, Baltimore, Md., distributor of arc welding equipment and supplies manufactured by The Lincoln Electric Company, Cleveland, Ohio, has moved from 116 East Centre Street to 1023 Cathedral Street.

Directory of ACI Coals

Appalachian Coals, Inc., Transportation Bldg., Cincinnati, O., have just issued their "Directory of ACI Coals" for 1935. It contains a list of operating companies, showing mine, and giving names, shipping points, post offices, seams, on what railroad, capacities and officers. There is a double cross index for easy reference. It contains 56 pages and a copy will be mailed on request.

"The Guide 1935"

The annual reference handbook, "The Guide 1935," published by the American Society of Heating and Ventilating Engineers, 51 Madison Av., N. Y. City, is now available. This edition has been enlarged and a new department added in the technical data section, which includes a series of problems in practice accompanying each chapter. It has four definite sections as follows—1. Technical Data Section, containing 41 chapters; 2. Catalog Data Section; 3. The Indices and 4. A. S. H. V. E. Roll of Membership. Price $5.00.

Brown Instrument and Minneapolis-Honeywell Regulator Open Atlanta Office

The Brown Instrument Company, Philadelphia, Pa., manufacturers of instruments and controls, and the Minneapolis-Honeywell Regulator Company, Minneapolis, Minn., manufacturers of Control Systems and regulators, have opened a joint office at 303—the 101 Marietta Street Building, Atlanta, Georgia, to serve the Southeast.

Mr. Wesley R. Moore, for a number of years District Manager of Brown Instrument Company, is Manager in charge, with Leon L. Kuempel, Sales Engineer, Charles A. Kitzinger, Service Engineer, and J. A. Crawley, Office Manager.

A Minneapolis-Honeywell stock will be carried, and complete sales and installation service maintained at this office for the complete lines of both companies.

Gas Used in Australia For Blending Oil with Graphite

Within the last year or two, Pacific Colloidal Graphite Oils Ltd. has established at Sydney a blending unit for mixing oils with colloidal graphite to meet the demand for special lubricants in industry. Much care and accuracy is required in the blending operation and temperatures are a matter of great importance. The blending unit handles a ton of mineral oil (240 gallons) at each operation.

After considerable research to determine the most suitable fuel to be used in heating, the Pacific Colloidal Graphite Oils Ltd. decided upon gas. The Australian Gaslight Company's engineers have installed a natural draught burner of the multi-ported ring type with a heat input capacity of a hundred gas units per hour. The plant has proved highly efficient. An interesting feature about the equipment is that the blending vat is suspended between two floors of the building, the top of the vat projecting just through the floor of the upper story. This facilitates the handling of the oil which is emptied into the vat from 40 gallon drums.

All sizes up to 3,400 cu. ft. capacity

Meters
Diaphragms
Repairs
Provers
Pumps
Calorimeters
Wet Meters
Gauges
Apparatus

METER REPAIR PARTS

FOR

ALL MAKES - ALL SIZES OF METERS

LARGEST GAS COMPANIES NOW USING OUR PARTS

SEND FOR OUR CIRCULAR ON METER REPAIR PARTS

SAMPLES AND PRICES GLADLY SENT

—•—

LAMBERT METER CO.

BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

New -and Better LAVINO 'GRANULAR' OXIDE *Purification*

EVERY GRANULE COMPLETELY AVAILABLE FOR H_2S REMOVAL—No shavings or other carrying mediums needed—No mixing trouble and costs—Easier handling—Gives about 4 times your present Purifier Box Capacity, thus—

FAR MORE PURIFICATION FOR THE DOLLAR EXPENDED

Write for literature—or, ask one of our experienced men to call, without obligation.

E. J. LAVINO and COMPANY

Bullitt Bldg.

Chicago Philadelphia, Pa. Pittsburgh

"WANTED"

"Leading water heater manufacturer requires salesmen to call on Utilities. Must have previous experience. Good territories open. Drawing account against Commission. Replies held confidential. Address Box 1062, c/o AMERICAN GAS JOURNAL, 53 Park Place, New York City.

MODERNIZE WITH MOHAWK PRODUCTS

ALL STEEL

MOHAWK HI-SPEED TRAILER

TOOL AND SUPPLY TRAILERS FOR GAS AND ELECTRIC COMPANIES

HOTSTUF BITUMEN HEATERS

LEAD AND COMPOUND MELTING POTS

Hotstuf

MOHAWK ASPHALT HEATER CO. 96 WEAVER ST. SCHENECTADY, NEW YORK 100 PARK PLACE, NEW YORK, NEW YORK

HEATING BUNKER "C" OIL

for carburetting gas requires high pressure and high temperature.

ANDALE BOWED TUBE HEATERS

remain tight and are easily cleaned. These are the requirements for continuous satisfactory operation.

ANDALE COMPANY

1600 ARCH STREET

PHILADELPHIA

Journal Computers

FOR

Low Pressure

Price $2.50 Each

American Gas Journal

53 Park Place, N. Y.

EQUIPMENT NEWS

New Air Filter Announced by American Radiator Company

A new corrugated fibre board air filter, of the replacement type, especially designed to give uniform resistance and efficiency, thus reducing power costs in air conditioning operations, has been placed on the market by the industrial division of the American Radiator Company, New York.

It can be used in air conditioning units, ventilating systems, warm air furnaces, window ventilators, air compressors and internal combustion engines.

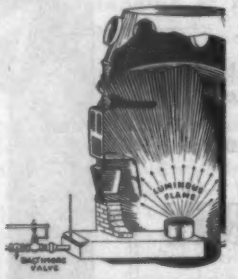
The filter is composed of two wafers of the corrugated fibre board placed together so that cellular passages in the two boards, which are cut at a 45° angle, from a V-shaped passage with a 90° angle in it. These angles cause the air flow to change direction twice and scrub along the sides of the passages.

The entire filter is coated with a special compound that saturates dust, catching it in the filter. Each dust particle as it is saturated becomes a medium for catching other dust, thus insuring long life for the filter. The coating will not become rancid, remains tacky at 10° F. and will not drip at 180° F.

Three models of the filter are offered, one in which the corrugated wafers have 3/16" cellular passages on both the inlet and the outlet sides for high efficiency industrial applications. Another, for ventilating or air conditioning systems where outside air has to be cleaned, has 5/16" passages in the inlet wafer with smaller 3/16" passages in the outlet wafer. The third, which has been designed for use where the major part of the air filtered is recirculated air, has ½" passages for the inlet wafer and 5/16" passages in the outlet wafer.

New Type Conversion Burner

John Zink Burners, Tulsa, Okla., has designed a gas conversion burner especially for the small income homes. It embodies new principles in the burner field, and fits the budget of the small-income home in two ways: by selling at a low price range, and by the application of a chain control in



place of the automatic control if such is desired for reasons of economy.

The burner has an operating range of from 3 to 250 cu. ft. per hour and burns either natural or manufactured gas with a luminous flame, requiring no secondary air. Eighteen impinging jets at the burner head project the gas to form a thin sheet of gas flame that clears the top of the burner stack. The flame does not touch the furnace sides, hence the furnace requires no lining.

The John Zink Burner acts as its own pilot, and a Baltimore cut-off valve, built into the burner, thus serves to cut off both pilot and burner in case of emergency. A simple limiting orifice replaces the usual regulator, and is one of the factors in the burner's low price.

The cut shows the burner installed in an ordinary coal furnace. This type of flame heats by radiation just as the coal fire heats.

New Type Pipe Coupling Simplifies Joint Making

Several unusual features are incorporated in a new, self-contained pipe joint just announced by the S. R. Dresser Manufacturing Company, Bradford, Pennsylvania. To make a connection with this new joint, called the Dresser Style 65 Compression Coupling, nothing is needed, according to the manufacturer, except the pipe, the joint itself and an ordinary wrench. Plain end pipe is used,

no special preparation of the pipe ends—such as threading, grooving, or flaring—being necessary. Making the joint simply involves inserting the pipe ends into the coupling (which comes assembled) and then tightening two threaded octagonal nuts with a wrench—the whole operation taking only a few seconds.

The resulting joint is not only permanently tight but absorbs normal vibration, expansion and contraction movements, and permits deflections of the pipe in the joint.

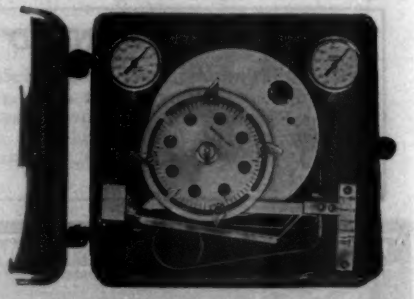
This flexibility plus permanent tightness, according to the manufacturer's announcement, is made possible by two resilient gaskets that encircle the pipe ends—one gasket around each end. As the nuts are tightened, these gaskets are compressed tightly around the pipe, gripping it with tremendous force and giving a positive seal. The principle involved is essentially the same as that used in other Dresser Couplings for the past 50 years.

Other advantages are these: the pipe need not be cut to exact lengths; joint making in cramped quarters is simplified; repairs on old lines can be quickly and easily made; and the joint is suitable for exposed lines because of its compact appearance.

Dresser Compression Couplings, Style 65, are supplied in standard steel pipe sizes from ⅜" I. D. to 2" I. D. inclusive, black or galvanized. The gaskets, which are provided with a flexible, metallic, patented armor in the tip, are suitable for temperatures up to 200° F.

The New Taylor Intermitter A Simplified Time-Cycle Controller

A new control instrument is now available for the automatic, intermittent operation of diaphragm valves or other diaphragm-operated devices. The outstanding features claimed for the instrument



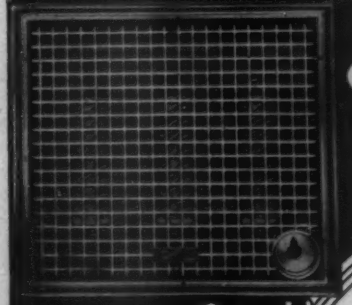
by its manufacturer—the Taylor Instrument Companies, Rochester, N. Y., are: simplicity, dependability and adaptability.

The Taylor Intermitter differs in function from the Taylor Time-Cycle Controller in that it is limited to the repetition of a single operation whereas the latter is capable of performing a number of different operations during the revolution of the cam. The simplicity of design and small number of moving parts is obvious from the accompanying illustration.

Instead of employing the conventional fixed cam to time the intermittent operation of a diaphragm valve or other diaphragm-operated devices, the Taylor Intermitter has a circular cam on which the proper number of actuating lugs may be placed; the number of lugs corresponding with the number of operations to be performed during the rotation of the cam. As many as twenty lugs may be used.

The instrument is available in two types: Reverse-acting; lugs to close nozzle, applying pressure to diaphragm motor. Direct-acting; lugs to open nozzle,

"WE USE CHACE Exclusively" WESIX, INC.

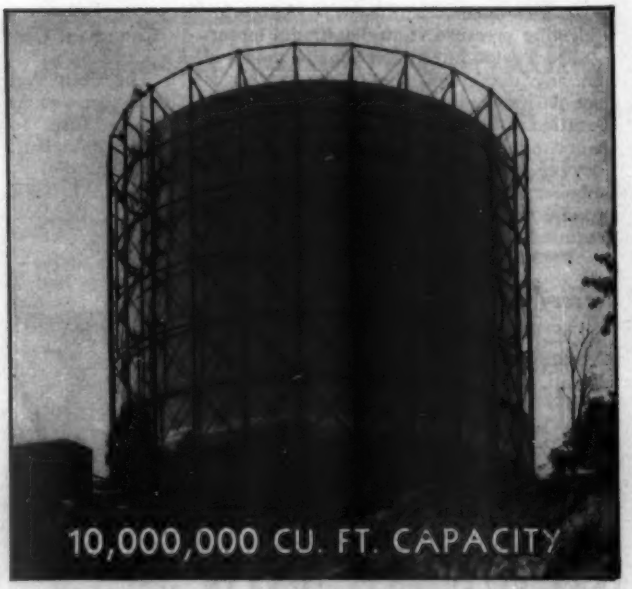


WESIX Electric HEATER

CHACE THERMOSTATIC BIMETAL "It Bends with the Heat"

Wesix Electric Air Heaters automatically maintain uniform temperature throughout the whole room by means of a built-in thermostat, the active element of which is Chace Bimetal. Because of its dependability, many leading manufacturers who seek reliable temperature control or who require an automatic action as change in temperature takes place now use Chace Bimetal.

W. M. CHACE VALVE CO.



HIGH PRESSURE GAS HOLDERS LOW PRESSURE

PURIFIERS · TANKS · CONDENSERS

STEEL PLATE CONSTRUCTION

INTEGRITY GOOD WORKMANSHIP FAIR DEALING

CRUSE-KEMPER CO.

AMBLER, PA.

THE GOODMAN STOPPER

The Reliable Shut-Off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.

523 Atlantic Avenue, Brooklyn, New York

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of

Standard Gas and Electric Company

231 South La Salle Street, Chicago

New York Pittsburgh San Francisco

ALFRED I. PHILLIPS

CONSULTING ENGINEER

Rate Development Valuations Reports

Design Management

122 GREENWICH STREET NEW YORK

relieving pressure from diaphragm motor.

The Taylor Intermitter may be mounted on any diaphragm motor or, if this is not desirable, in any convenient adjacent location. Also, it is possible to operate more than one diaphragm valve or similar device from the same instrument, the number depending upon the operating conditions and the nature of the control required.

Stacey Manufacturing Company Opens New York Office

Stacey Manufacturing Company, Cincinnati, O., whose reorganization was recently completed, has re-opened their New York office at 19 W. 34th Street. Mr. Peter F. McEnaney has been reappointed Eastern Sales Manager with headquarters at the above address.

NEWS OF THE INDUSTRY

"Oldest Bill" Contest

The Rochester Gas & Electric Corporation, Rochester, N. Y., recently ran an "Old Bill" Contest, prizes being awarded to the oldest gas bills presented to the office.

At the close of the contest the oldest known gas bill presented was 85 years old. This bill was owned by Mr. C. S. Jennings, an employee of the company. Therefore the first prize of $10. was awarded to the next oldest gas bill presented by Mrs. Nathaniel McDowell. Mrs. McDowell's bill bore the date of November 15, 1864. The bill presented by Mr. Jennings was dated September 1, 1850 and the company awarded a special $10. prize for producing same. Prizes were awarded also for the oldest electric bills.

Koppers Gets Contract from The Ford Motor Company

The Ford Motor Company has awarded The Koppers Construction Company a contract for the construction of two batteries of Becker type ovens for Ford's River Rouge Plant.

The equipment will consist of 122 ovens of the latest Koppers design and will represent the largest by-product coke oven installation that has been built in over 7 years.

Republic Steel Corp. Moves Philadelphia Sales Office

The Philadelphia District Sales Office of Republic Steel Corp., and subsidiaries, Berger Mfg. Co., and Union Drawn Steel Co., have moved from the Fidelity-Philadelphia Trust Bldg., to the Broad Street Station Bldg., 1617 Pennsylvania Blvd.

J. B. DeWolf continues in charge of the office as District Sales Manager, assisted by the present staff.

Canadian Gas Association Meeting

The 28th Annual Convention of the Canadian Gas Association is to be held in Quebec City, June 10th and 11th. The program includes the following valuable contributions:

1. COAL TAR AS A BOILER FUEL—by C. W. Delorey, Plant Chemist, Gas Division, Quebec Power Co., Quebec.
2. AN ELECTRIC GAS GENERATOR—by Ivar Hole, M. N. I. F., Oslo, Norway.
3. LOAD BUILDING GAS RATES—by K. L. Dawson, Supt. Gas Department, Nova Scotia Light & Power Co., Ltd., Halifax, N. S.
4. THE USE OF MANUFACTURED GAS IN INDUSTRIAL BAKE OVENS—by J. Fremont, Sales Manager, Gas Department, B. C. Electric Railway Co., Limited, Vancouver, B. C.
5. METER DIAPHRAGMS—by E. J. Turley, Mechanical Superintendent, Montreal Light, Heat & Power Consolidated, Montreal, Quebec.
6. BENZOLE RECOVERY—by G. W. Page, Superintendent, Montreal Coke & Mfg. Company, Montreal, Quebec.
7. OUTDOOR GAS WORKS — by Henry Underhill, Chief Engineer, Bartlett Hayward Company, Baltimore, Md.
8. EXTREME LOW TEMPERATURE EFFECTS ON GAS MAINS AND WORKS—by Messrs. A. E. Paul and H. Dunderdale, Winnipeg Electric Company, Gas Division, Winnipeg, Man.
9. VARIOUS INDUSTRIAL FUEL APPLICATIONS, WITH THE CORRESPONDING APPARATUS AND GAS RATES WARRANTING THE USE OF GAS RATHER THAN SOLID OR LIQUID FUELS—by O. L. Maddux, Industrial Engineer, United Gas & Fuel Co. of Hamilton, Limited, Hamilton, Ont.

New Book on Air Conditioning

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., recently issued a book titled, "This Thing Called Air Conditioning." The book is a discussion in simple every day English of the six cardinal factors governing all-year-around conditioning of the air, the primary requisites for successful conditioning and a discussion of the various systems and the importance of automatic control to the proper operation of any system, large or small. It covers all phases of the subject, including types of equipment, construction factors, etc. Every gas man interested in air conditioning will find much valuable information in it. A copy will be mailed on request.

New Officers of Pennsylvania Gas Association

The Pennsylvania Gas Association held their twenty-seventh annual meeting May 7-8-9 at Sky Top, Pa. It was well attended and the papers presented were on subjects of timely interest. The paper presented by Mr. W. L. Ruchworth,

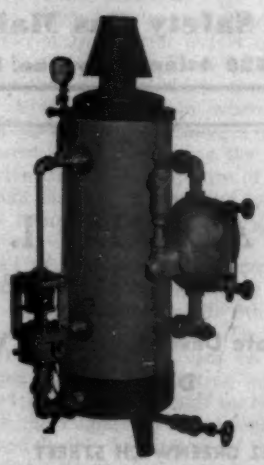
E. W. Ehmann

Philadelphia Gas Works Co., on "Renewing Services Under Paved Streets," is printed elsewhere in this issue of the JOURNAL. The following officers were elected to act during the coming year:

President, E. W. Ehmann, Ardmore, Pa.; First Vice President, H. N. Squier, Scranton, Pa.; Second Vice President, N. B. Bertolette, Harrisburg, Pa.; Third Vice President, W. A. Norris, Lebanon, Pa.; Secretary, F. W. Lesley, York, Pa.; Treasurer, W. G. Sterrett, Jenkintown, Pa.; Managing Director, A. B. Millar, Harrisburg, Pa.

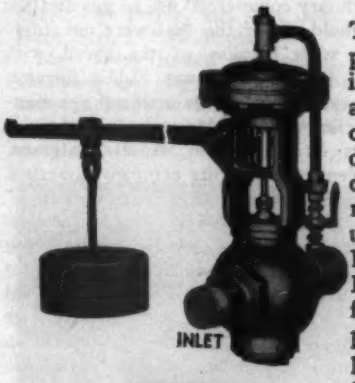
Mr. Ehmann is manager of the Main Line Division of the Philadelphia Electric Company with headquarters at Ardmore, Pa.

Pressing Machine and Steam Iron—
BOILERS



P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

for high pressure oil and gas lines



Two thousand pounds pressure to the square inch can be controlled, and gas can be passed on to the main or the distributing line at reduced pressure to suit requirements, by the use of the proper C-F Regulator. Standard Regulators are designed for pressure up to 600 pounds. For higher pressure, designs are adapted according to specification.

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QUICKLY AND ECONOMICALLY!

Johnson Melting Furnaces are known far and wide for their efficiency and economy. They are made in capacities ranging from 15 lbs. to 600 lbs. The illustration shows the No. 300, capacity 150 lbs. Equipped with powerful Bunsen Burners which provide quick, intense heat without blower. Write for full details.

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Cedar Rapids IOWA

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C. B. Babcock Co.
135 Bluxome Street
San Francisco, Calif.

Eastern Representative:
J. H. McPherson
250 Stuart Street
Boston, Mass.

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an outside room with bath, shower and radio is *Only* $2.50 at the Hotel Montclair and just $3.50 for two persons

One of New York's largest and newest hotels containing 800 outside rooms. Located in the center of the world's greatest business-shopping district—the Grand Central Zone.

DISTINCTIVE SEASONAL FEATURES

Casino-in-the-Air — New York's largest open air roof of floral terraces — where all meals are served during summer season. 2 Orchestras—Dancing. Breakfast from 30c. Luncheon 65c and Dinner with dancing and entertainment, only $1.25.

Upper Sports Deck — where guests can take a sun bath in a bathing suit or enjoy deck sports.

HOTEL MONTCLAIR

THE TRULY AMERICAN HOTEL WITH AMERICAN TRADITIONS

Lexington Avenue at 49th Street • New York City • GRAND CENTRAL ZONE

Comparative Fuel Costs for Water Heating

The American Gas Association announces that the Final Report of Comparative Water Heater Tests Conducted at Massachusetts Institute of Technology, is now available. It has been prepared in such a way as to present the complete results of the tests in the most convenient and useful form for the use of member companies. This report will be of greatest value not only to executives in charge of sales and to sales managers in their efforts to promote the sale of water heating by gas, but also to rate engineers and other gas company personnel involved in the formulation of gas rates for water training purposes.

The work was begun in January, 1934, by Professor Gordon B. Wilkes of Massachusetts Institute of Technology who conducted the tests, and concluded during the latter part of September, and undoubtedly constituted the most comprehensive series of tests ever conducted on the competitive aspects of water heating. It covered seventeen different types of gas water heaters, giving fuel consumption in comparison with competitive types utilizing electricity, oil, and soft and hard coal, both in individual water heaters and in connection with house heating equipment. The reputation of Massachusetts Institute of Technology insures that the results carry authority to all.

The complete data resulting from this project are available to member companies for the sum of $10 for the first copy of the above publication, and $2 for each additional copy.

Rate Bibliographies Available

The American Gas Association recently announced the publication of a bibliography on rates to supplement the one issued in 1930. As these two editions contain references to practically all forms of public utilities, the bibliographies should be of rather extensive interest. The rate references include those on the gas, electrical, telephone, telegraph, water, railroad, heating and refrigeration utilities, and also on the infant public utility, air transportation. The Association has been put to considerable expense in making available these valuable tools covering the entire public utility field.

The work of compiling the bibliographies, a most arduous task, was performed by Mr. O. E. Norman of the Peoples Gas Light and Coke Company, under the sponsorship of the Rate Structure Committee of the American Gas Association. An indication of the thoroughness and completeness of the work is the fact that there are a total of 8,446 references in the two editions.

The first edition was published in 1930 and includes references from 1815 to 1930. The latest edition includes references from 1882 to 1934. The latter necessarily overlaps the former so that for complete coverage both editions should be used.

The two volumes offer sources presenting: a complete history of public utility together.

Ind. Southwestern Gas Corp. Sold

Purchase by an Indiana syndicate of the Indiana Southwestern Gas Corporation has been announced by Raymond D. Brown of Indianapolis. Gas and oil leases, wells, operating and equipment and hundreds of miles of pipe lines, estimated to be worth $1,500,000, are involved in the sale. The company supplies the natural gas distributed by public utility companies serving Vincennes, Evansville, Washington, Oakland City, Francisco, Wheatland, Bicknell, Monroe City, Princeton and other southwestern Indiana towns. Control of the company has been by Eastern interests.

The new syndicate will be headed by Mr. Brown as president. Andrew M. Hatfield of New York City, who will move to Vincennes shortly and has been an associate of Mr. Brown for years, is vice president and treasurer; D. L. Rinehart of Indianapolis, secretary. Frank E. McKinney of Indianapolis, a banker, and John N. Dyer, Vincennes, are directors. The new owners have taken over control and plan to continue to expand the business.

Selling Water Heaters on Rental Plan

The Birmingham Gas Company, Birmingham, Ala., which for some months has offered to install conversion burners on a rental basis is now offering to rent gas water heaters, the price ranging from 95 cents per month for a new heater for an old tank, to $1.88 for a new automatic storage heater.

"This new rental plan places the comfort and convenience of automatic hot water service within the reach of every family budget," says an announcement by the company. Under this plan business from persons who rent is sought. Rental payments will be applied on the purchase price of any appliance if desired.

Old Gas Range Contest

More than 500 old stoves were entered in a contest recently conducted by the Birmingham Gas Company, Birmingham, Ala., first prize going for a 34-year old product manufactured by the Detroit Stove Company. A new AB gas range was the prize.

Acorcding to Wm. G. Hudson, sales manager, it was necessary to correspond with the factories in order to establish the true age of some of the relics entered. Persons who did not win a prize (several were offered) were invited to trade in their old stoves at an attractive allowance for new ones. Sales showed a tremendous increase during the campaign.

Atlanta Gas Light Co. Issues New Securities

An issue of $500,000 in new securities by the Atlanta Gas Light Company and its affiliated properties in Georgia was approved by the Georgia Public Service Commission on May 5th, 1935. The securities, it is announced, will be used for the purpose of purchasing domestic gas appliances for re-sale by the company.

Four 12-Inch Natural Gas Lines Break Near Jackson, La.

The breaking of four 12-inch natural gas mains near Jackson, La., where the mains cross Thompson's creek, May 20th, caused restriction of the use of natural gas in large industrial plants in New Orleans during the day.

Ordinary commercial use of gas and the household use of the fuel were not interfered with because of the speed with which the New Orleans Public Service, Inc., was able to get its artificial gas manufacturing plant at Magnolia and Gravier streets into operation, A. B. Paterson, president of the utility company, asserted.

"We held all the natural gas we could," he said, "and we mixed it with the artificial gas as soon as the new supply of the latter began to be available. We did not have to cut off any of the commercial users. For some hours we had to restrict the supply to large industrial users, so that there would be enough for households and ordinary business needs."

Baton Rouge was the city most affected by the natural gas main break, because the larger part of that city was deprived temporarily of all gas supplies. The Standard Oil Company plant and that of the Louisiana Steam Generating plant switched quickly to their emergency oil supplies, but the Solvay Process Company was forced to close its plant.

New Orleans homes and commercial houses were cared for adequately by the output of the company's artificial gas plant.

The Interstate Natural Gas Company, owner of the pipeline which brings natural gas south from the Morehouse fields, called in crews from Woodville, Natchez and Monroe to repair the lines across Thompson's creek.

Four 12-inch lines which cross the creek were severed because of the caving of the bank following heavy rains.

Normally the creek is about four feet deep and 50 feet wide where the break occurred, but now the creek is swollen to 15 feet deep and 300 feet wide.

A new supply of pipe was sent to the creek and, with the assistance of additional crews being brought in from Woodville, Natchez and Monroe, the company hoped to have gas in the mains again within 24 hours.

In the meantime, a temporary supply of gas was supplied from the lines of the Southern Gas & Fuel Company, which carries the natural gas from Baton Rouge to New Orleans, and workmen for the Baton Rouge Electric Company were busy cutting the gas back into the individual business establishments and homes.

Baton Rouge hospitals were supplied with emergency electric heating equipment and electric company employes cared for the needs of the homes in which there was sickness in the emergency.

Personals

American Meter Company Promotes M. N. Bailey

American Meter Company has announced the appointment of Mr. M. N. Bailey to the position of Assistant Manager of its factory and sales office at 1513 Race Street, Philadelphia.

Mr. Bailey joined the John J. Griffin Company on July 1, 1915 and had been sales representative for that factory and subsequently for American Meter Company as a whole.

M. N. Bailey

He resides in Royersford, Pa., where he is active in the Chamber of Commerce, formerly as a Director and now as State Counselor of this local organization. He is also a member of the Penn Athletic Club and of various fraternal organizations. A member of the A.G.A., Pennsylvania Gas Association, Southern Gas Association, New Jersey Gas Association and Maryland Utilities Association, he has served on various committees and is at present a member of Council of the Pennsylvania Gas Association and Chairman of the Entertainment Committee.

L. F. Ryall Appointed Manager of General Gas Light Company

L. F. Ryall has been appointed to the position of Sales Manager of the General Gas Light Company, Kalamazoo, Mich. Mr. Ryall was formerly associated with the company in the capacity of Vice President in Charge of Industrial Sales. In his present position he will supervise the sales of their entire line of appliances.

"Governor" Hayward

The many friends of Sterling F. Hayward, Chairman of the Board of Connelly Iron Sponge & Governor Co., known to the older gas men as "the Governor," will be glad to know that he is now recuperating at his Florida home, Mount Dora, after a major operation at the hospital in Orlando, Fla.

S. F. Haywood

Mr. Hayward has attained the age of 89, most of which time has been spent in the gas industry with the Connelly Co. In 1933 he toured the world as the climax of his life, visiting many gas men in Europe, Asia and the Isles of the Sea. All men in the gas industry join in wishing him a speedy and complete recovery.

Obituary

GEORGE H. CRESSLER

George H. Cressler passed away suddenly in Cincinnati, O., May 20th.

Mr. Cressler was 55 years old and graduated with a Ph. B. degree from the Sheffield School, Yale University in 1902. Immediately upon leaving college he entered the gas industry in the employ of his father, Mr. A. D. Cressler, who at that time owned and operated the Kerr-Murray Manufacturing Company, Fort Wayne, Indiana. In 1914 he entered the consulting engineering business in Chicago and operated under the style of Walker and Cressler. In 1917 he left this business and received a commission as Captain in the Ordnance Department, United tSates Army and was stationed in Los Angeles.

In 1920 he was appointed General Sales Manager of the Stacey Manufacturing Co., Cincinnati, O., and upon its reorganization last year was elected vice-president in Charge of Sales.

JOHN F. PARKER

John F. Parker, associated for thirty-five years with the Geo. D. Roper Corporation, died at his home in Rockford, Illinois, on Thursday evening, May 9.

Mr. Parker was born in Henderson, Kentucky, in February, 1858. For the past thirty-five years he had been a resident of Rockford, Illinois.

Convention Calendar

June

10-11 Canadian Gas Association, annual convention, Quebec, George W. Allen, secretary, 21 Astley Ave., Toronto, Canada.

20-22 Michigan Gas Association Annual Convention, Grand Rapids, Mich. A. G. Schroeder, Secy.

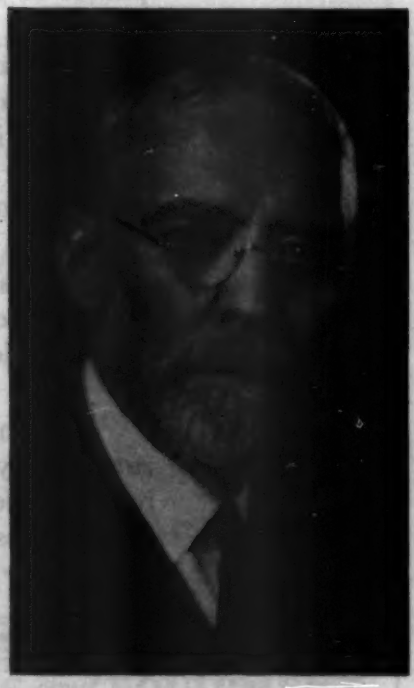
27-29 N. Y.—N. E. Regional Sales Conference, Griswold Hotel, New London, Conn.

September

17-19 Pacific Coast Gas Association, Pasadena, Calif.

October

14-18 American Gas Association, 17th annual convention, Atlantic City, N. J. Alexander Forward, managing director.



John F. Parker

Intimate friend and employee of the late Geo. D. Roper, Mr. Parker was closely associated with the growth of that firm. As its representative, he had traveled the country over, making numberless friends en route. Everyone knew him as "John" or "Colonel" and welcomed his visits. One of his proud claims was that his sales were made on the basis of honesty and personality, without benefit of catalogs, sales manuals, or other printed matter.

Mr. Parker was widely known, also, because of his Rotarian activities. He was the founder of the local Rotary Chapter in Rockford, was its first president, and was recently honored by being made a lifetime member.

Now—

more than ever—

it is essential that executives in the gas industry keep posted on the latest methods developed for solving the many problems that are constantly arising in their respective departments.

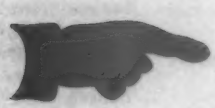
The American Gas Journal is a veritable clearing house of practical ideas — tried-and-proved methods covering all phases of gas manufacture, distribution, utilization and sales.

Outstanding writers and authorities in their respective branches of the industry contribute articles of exceptional value and interest each month to this pioneer gas publication. The American Gas Journal celebrated its seventy-fifth year of continuous service to the gas industry.

This issue is a typical one. Glance over its editorial content. No other publication in this field presents in one issue such a variety of interesting informative articles to its readers.

Why not send in your subscription today? The annual rate is only $2.00 per year. The money-saving and business-building ideas you will obtain from one issue alone will pay many times over the cost of a year's subscription.

Use the coupon below.



THE AMERICAN GAS JOURNAL
53 PARK PLACE, NEW YORK

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ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P-C

Manufacturers of All Kinds of Gas Apparatus

NEWARK, NEW JERSEY

PURIFYING MATERIAL — BAGGED, OR IN BULK
Manufacturers of GOVERNORS, APPARATUS *and* EQUIPMENT

IRON Connelly Iron Sponge and Governor Co. Elizabeth, N.J. Chicago **SPONGE**

1876 [USE THE BENEFIT of 58 YEARS EXPERIENCE] 1934

IMPROVED EQUIPMENT ~ RUSSELL ENGINEERING

Coal Gas Plants — Horizontal Ovens, Benches, Refills, Additions, Repairs, Charging and Discharging Machines

CORPORATION
24 STATE STREET
NEW YORK

Oil Gas Plants — "Refractory Screen" Process for Base — Standby or Peak Loads — On Existing or New Water Gas Sets Low or High B. T. U. Gas

The Crowning Event of 1935

(Continued from page 43)

town. The Knights also act as escorts during the Queen of Yohomia beauty contest and one, in uniform, is assigned to the school each day, operating the sound projector and acting as usher.

Dealer Cooperation

The company's merchandise policy embraces full dealer cooperation and all appliance dealers are enjoying full participation and benefit from "The Crowning Event of 1935"—both from the general activity as well as the various cooking schools and dealer exhibits. A series of dealer meetings were held, at the beginning of the campaign, in each of the company's eight sales districts and the dealer's part in the activity was fully explained in a dealer prospectus, which invited him to "Join the Crusade to Yohomia—the golden land of sales opportunity in 1935—and earn a princely reward by crowning Mrs. Modern Queen of the empire within the walls of her home."

Dealers throughout the entire territory served by our company are well pleased with the entire activity and dealer sales are exceeding expectations by wide margins.

Employee Participation

A special employee booklet was printed and distributed at special employee meetings. This booklet explains the company's liberal compensation plan for employee selling and tells of a "Prince and Princess Contest" to be held in connection with "The Crowning Event of 1935." The leading man and woman of the company, during the ninety-day sales drive, will be named Prince and Princess of Yohomia, respectively, and will receive a cash prize in addition to the regular bonus for appliances sold.

Prospect System

Employees are not expected to actually close major appliance sales, so they are supplied with employee prospect cards. They can file a card on a prospect with whom they have personally talked and if no employee has previously filed on the person mentioned, they will be protected for thirty days. If the sale is made in thirty days, the employee receives credit for the sale. Employees receive the same credit for sales made by dealers as for sales closed directly by the company. Junior salesmen also file prospect cards on every customer they visit.

Advertising

Teaser advertisements were used in newspapers to good effect and a full schedule of newspaper advertising is being inserted in fifty-four daily and weekly papers during April, May and June. An attractive 24-sheet poster or billboard was made up for this activity and posting made in forty-four towns. Radio programs of the company feature "The Crowning Event of 1935" and extend the invitation to every listener to "Crown Yourself Queen of Yohomia."

King of Yohomia

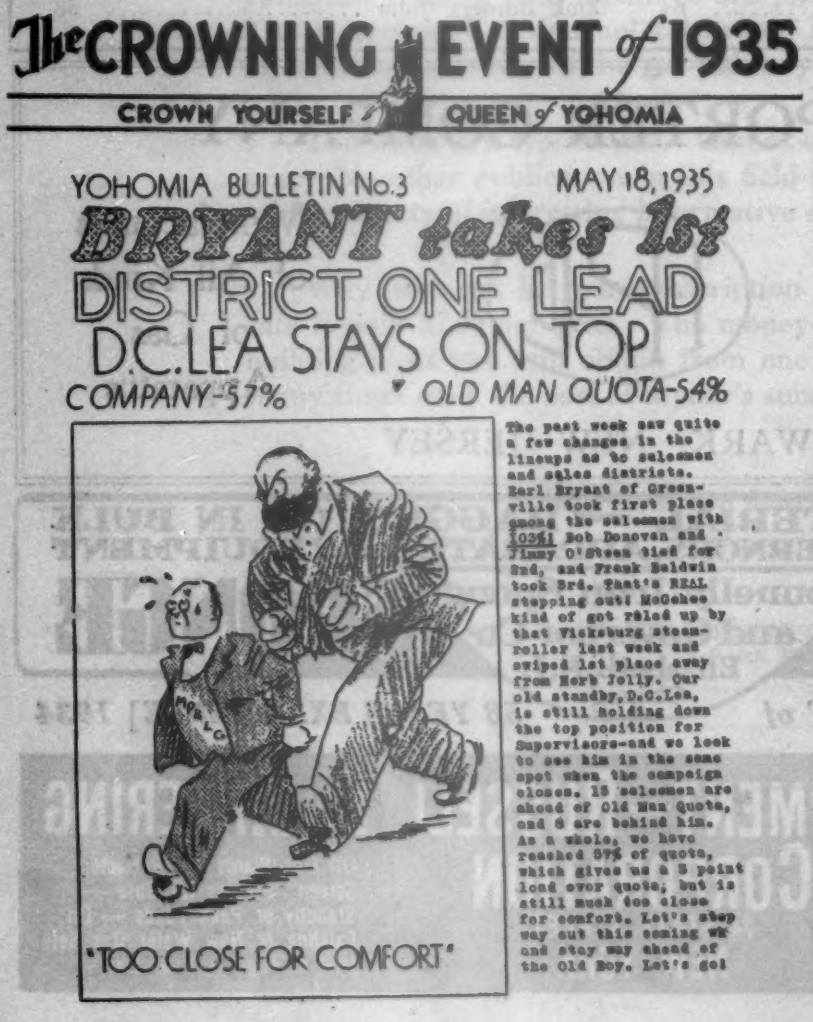
A company-wide contest was launched in order to add extra interest to "The Crowning Event of 1935." The contest is being conducted between the sales captains of the company's eight sales districts and the sales captain that exceeds his set quota by the greatest per cent will be crowned "King of Yohomia" at a coronation ball that will be held in the winning sales district soon after July 1st. The sales captain reaching the lowest per cent of or over quota will be named court jester. Cash prizes have been offered to the winning sales captain, sales supervisor, and salesmen, as well as to the leading dealer in the winning sales district.

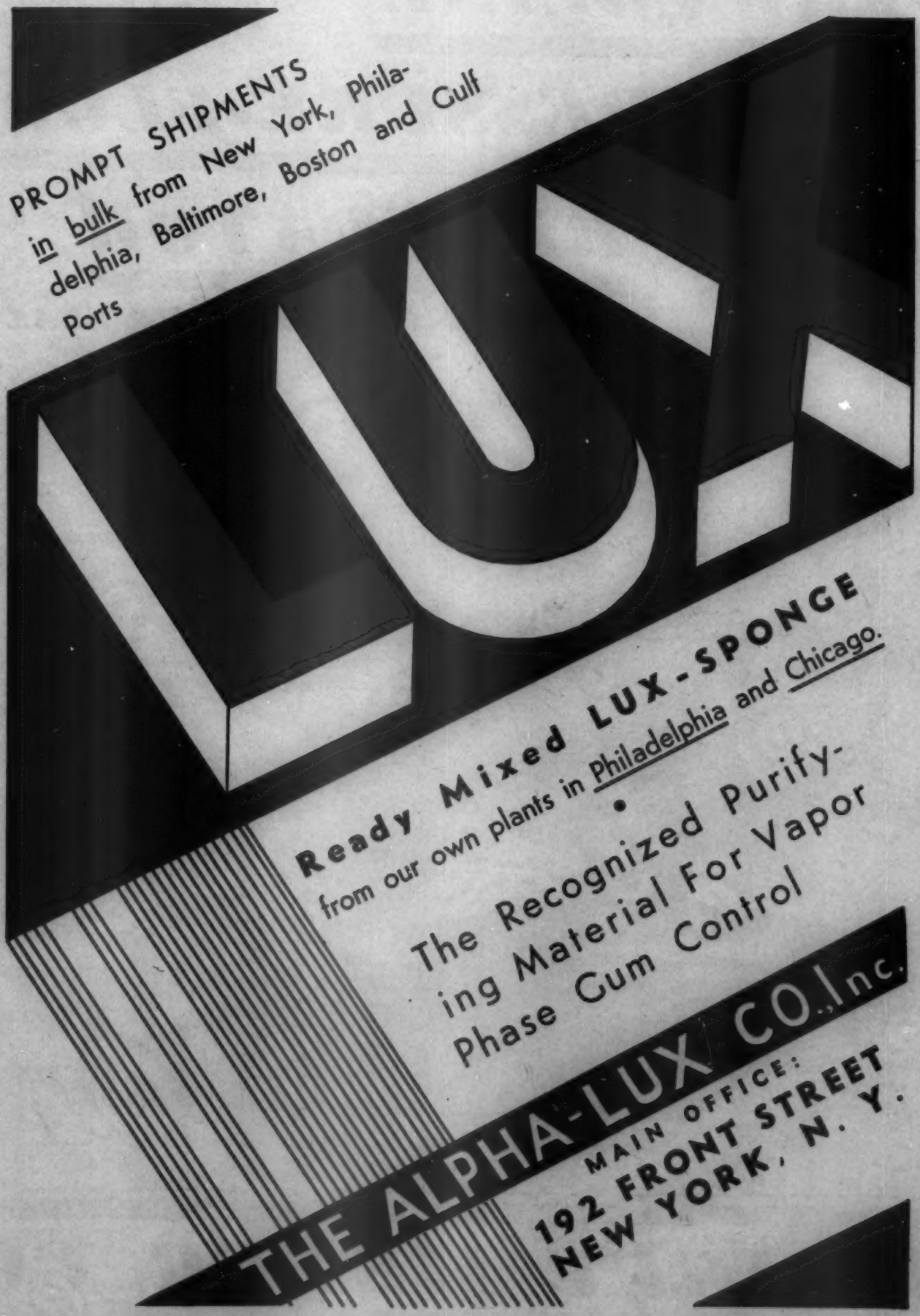
Sales Reports

In order to keep an activity of this nature going and for the residential sales department to issue weekly progress bulletins, the following special Yohomia sales reports are being used: dealers' weekly reports, senior salesmen's daily reports, junior salesmen's daily reports, home economists' daily reports, chief clerks' weekly reports, sales supervisors' weekly reports.

Summary of Activities

It is essential to the success of an activity such as this, that each party having a part in the campaign, know exactly the duties he or she is to perform. With this in mind, the following Summary of Sales Activities for "The Crowning Event of 1935" was published:


The CROWNING EVENT of 1935
CROWN YOURSELF QUEEN of YOHOMIA
YOHOMIA BULLETIN No.3
MAY 18, 1935
BRYANT takes 1st
DISTRICT ONE LEAD
D.C.LEA STAYS ON TOP
COMPANY-57%
OLD MAN QUOTA-54%
"TOO CLOSE FOR COMFORT"
The past week saw quite a few changes in the lineups as to salesmen and sales districts. Earl Bryant of Greenville took first place among the salesmen with 103% Bob Donovan and Jimmy O'Steen tied for 2nd, and Frank Baldwin took 3rd. That's REAL stepping out! McCahee kind of got riled up by that Vicksburg steamroller last week and swiped 1st place away from Herb Jolly. Our old standby, D.C.Lea, is still holding down the top position for Supervisors-and we look to see him in the same spot when the campaign closes. 18 salesmen are ahead of Old Man Quota, and 6 are behind him. As a whole, we have reached 57% of quota, which gives us a 3 point lead over quota, but is still much too close for comfort. Let's step way out this coming wk and stay way ahead of the Old Boy. Let's get


PROMPT SHIPMENTS
in bulk from New York, Philadelphia, Baltimore, Boston and Gulf Ports
LUX
Ready Mixed LUX-SPONGE
from our own plants in Philadelphia and Chicago.
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The Recognized Purifying Material For Vapor Phase Gum Control
THE ALPHA-LUX CO., Inc.
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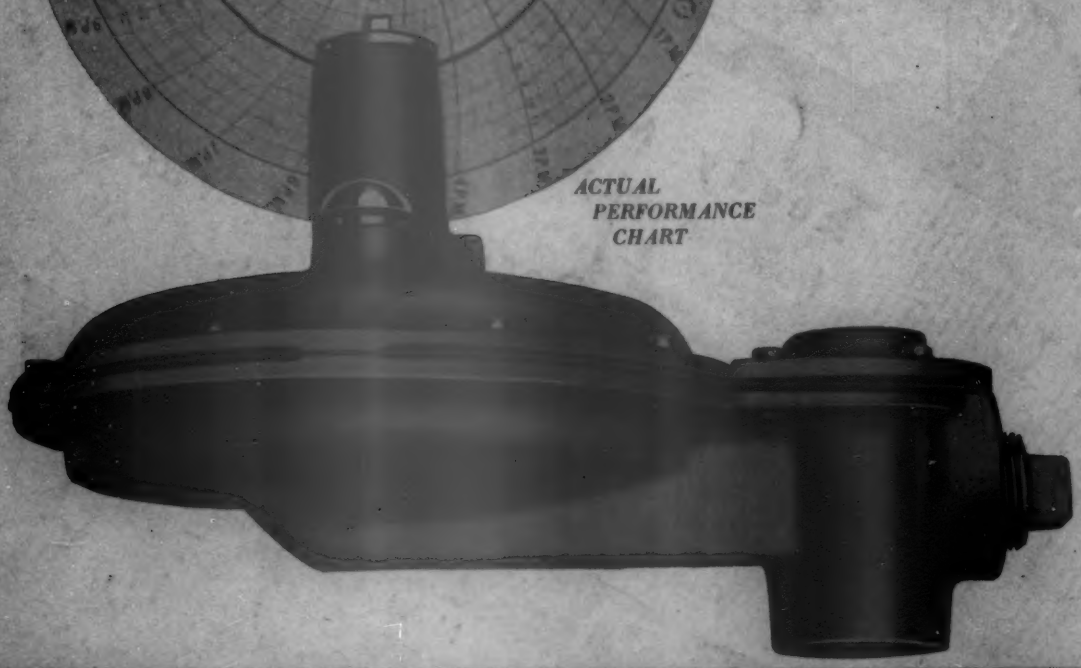
STREAMLINE PRESSURE-FLOW REGULATOR

WITH OR WITHOUT SEAL

ACTUAL PERFORMANCE CHART



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DESIGNED ACCORDING TO THE BASIC PRINCIPLES OF AERO-DYNAMICS

NO LOADING SPRINGS, TUBES OR SPECIAL GADGETS.

UNIFORM OUTLET PRESSURE FROM THE SMALLEST FLOW TO 900 CU. FT. PER HOUR.

MINIMUM LOCK-UP PRESSURE.

STREAMLINE ALL YOUR SPRAGUE REGULATORS AT A MODERATE COST.

WRITE FOR PARTICULARS.

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BRIDGEPORT CONNECTICUT